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Phormium tenax in New Zealand history

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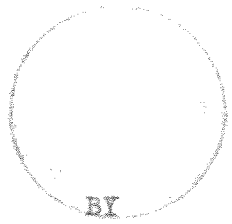
PHORMIUM TENAX

IN

NEW ZEALAND HISTORY.



BY

Samuel J. D. McCay.

1952.

PHORMIUM TENAX IN NEW ZEALAND HISTORY.

(A study of Phormium Tenax in New Zealand History to the year 1872.)

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C O N T E N T S.

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P R E F A C E.

At the outset of my research on this subject, I was given the opportunity of interviewing an old flax-miller at Foxton, Mr. E. W. Sutton, who, while giving me considerable valuable material, told how many men, during their attempts to utilise Phormium tenax, had become so fascinated with this plant and its fibre that they could not stop their experimentation; such was the enthusiasm aroused in them. In the course of reading, I must confess I have been imbued with some of that insatiable interest. Consequently, having followed the connection of Phormium with New Zealand history to the year 1872, I now feel obliged to add that I fully realise how modest a beginning to this study this thesis is.

In response to all those who have persistently enquired, "How important (if important at all) was Phormium tenax to New Zealand history, to those who first visited New Zealand and to those who settled in it, to those who traded with New Zealand and to those who helped to civilise it?" - to all such enquirers I can only say I trust that they will agree with the conclusions I have drawn from the facts here presented. That this plant with its fibre was important I have not the slightest doubt; the writings of so many capable men from Captain James Cook to Doctor James Hector bear witness to that fact. It has therefore been my task to endeavour to present a disinterested (though necessarily highly selected) picture of the opinions and reactions, of the experi-

ments, successes and failures of those who were vitally interested in the welfare of Great Britain and New Zealand, to which, they believed, Phormium tenax could profitably contribute.

Most of the work for this study was done in the Hocken Library, to the staff of which I must here express my humble and sincere appreciation for their genial helpfulness. Without the assistance of Mr. W. M. Boyce, of the staff of the Moutoa Research Station, and Dr. H. D. Skinner, of the University of Otago, the sections relating to the botany and Maori usage of Phormium tenax could not have been written. More appreciation than can be expressed here, however, I must extend to Dr. Angus Ross for the unflagging interest he has taken in this investigation, and the helpful criticism which he has constantly given.

S. J. D. McCay

CHRONOLOGICAL TABLE OF THE MAIN EVENTS.

1769 - 1872.

1769 October - Captain James Cook arrived in New Zealand in the "Endeavour", commenting on Phormium tenax.
December- De Serville's visit to the northern tip of New Zealand.
1772 June - Marion Du Fresne at the Bay of Islands (murdered there).
1773 March - Cook's landing in New Zealand on his second voyage.
1783 August - James Maria Matra's proposal for settling New South Wales and using New Zealand flax.
1786 August - Lord Sydney's proposal, following Matra.
1787 May - Governor Phillip sailed from England to found New South Wales.
1788 February- Phillip despatched Lieutenant Philip Gidley King to Norfolk Island to settle it, marking the commencement of experiments with Phormium.
1791 November- King stipulated the need for Maoris to demonstrate how to dress the New Zealand flax.
1791 November- Captain George Vancouver visited New Zealand and gathered flax.
1793 March - Labillardière (sailing with D'Entrecasteaux) collected Phormium tenax to take to France for examination.
1793 May - Lieutenant Hanson of the "Daedalus" kidnapped two natives for Kings benefit. (They were returned in November of the same year.)
1794 June - Governor John Hunter's instructions made special mention of investigating the New Zealand flax.
1796 - Labillardière's statement on the qualities of Phormium tenax; this was the first statement of results of tests.
1800 June - Governor King's instructions to the Lieutenant-Governor of Norfolk Island, urging the use of Phormium.
1804 - Phormium tenax was successfully grown in New South Wales.
1806 June - Mention in the Sydney Gazette of the Phormium's superiority to European fibres.
1809 - Mr. M. J. J. Donlan began extensive experiments in England on Phormium tenax.
1809 - The Lord, Williams, and Thompson syndicate to trade in flax in northern New Zealand. (They failed in 1810.)
1813 March - Contract signed in Sydney for trading in flax in southern New Zealand.
1813 August - Rev. Samuel Marsden wrote to the Church Missionary Society praising the New Zealand flax and urging the Society to become interested in it.
1814 October - The formation of the New South Wales New Zealand Company.

1814 December - Samuel Marsden's visit to New Zealand in the "Active", when he traded in flax. (Returned to Sydney, February, 1815.)

1817 April - Robert Williams' proposal for setting up a factory in New Zealand, with Imperial trading concessions.

1818 June - Report from the Chatham Rope Yard, England, on the Phormium samples sent to them by Williams.

1818 - Export of Phormium from Sydney to England of sixty tons.

1819 April - Church Missionary Society interest, and communications with the Navy Board on Phormium.

1819 - Commissioner Bigge's Enquiry on New South Wales - interested in Phormium, setting tests and trials going.

1820-1821 - Reports from the tests requested by Bigge.

1821 January - Robert Sugden's proposal for colonising New Zealand for the purpose of trading in Phormium - addressed to Lord Bathurst.

1822 February - The interest of the Committee of the Privy Council for Trade.

1822 November - New South Wales Government scheme; sent Captain Edwardson to Foveaux Strait area.

1823 - Kent followed Edwardson on a trading voyage.

1823 November - Edward Nicolls' proposal.

1825 - Three schemes for colonising New Zealand, trading in Phormium tenax, led by:-
(i) Baron Charles de Thierry, to the North Island;
(ii)Captain William Stewart, to Stewart Island;
(iii)Captain Herd, to Hauraki (changed to Hokianga).

1826-1827 - Visit of Dumont D'Urville to New Zealand.

1827 June - Colonel Torrens' proposal.

1828 July - Samuel Curtis' proposal.

1831-1834 - The controversy of M. J. J. Donlan with the Navy Board.

1831 March - British Government contract signed for eight hundred tons of Phormium tenax.

1831 September- Donlan's factory destroyed by fire.

1832 March - Lord Teynham supported Donlan in the House of Lords.

1832 - The reluctance of the Maoris to gather and dress Phormium was noted.

1832 - James Busby, who showed a great interest in Phormium, was appointed as British Resident at the Bay of Islands.

1834 - Visit of George Bennett to New Zealand, and his comments on the flax.

1836 - John Murray's book on the value of Phormium tenax, printed on paper made from Phormium.

1838 - French interests in New Zealand and Phormium were clearly stated.

1838 - British interest in Phormium was revived in the work of the Select Committee of the House of Lords.

1838 - Two of Donlan's companies were formed:
(1) The National Sail and Waterproof Cloth Company; and
(2) The Staffordshire Hemp and Flax Company.

1839 - Rev. Dr. John Dunmore Lang's prediction of success in using Phormium tenax.

1839 - New Zealand Prospectus mentioning Phormium as an inducement for settling in New Zealand.

1840 February - First article in the New Zealand Journal on Phormium.

1840 May - Glasgow manufacturers hopeful of using Phormium.

1840 May - Donlan's accusations against the New Zealand Company's statements on Phormium.

1840 - Notices of the Scottish company (New Zealand, Waitemata, and Manakau Company) mentioned flax.

1840 December - Meeting called in Wellington to consider the uses of Phormium.

1841 February - Meeting held in Barrett's Hotel, Wellington; praise for the qualities and potentialities of Phormium.

1841 November - Donlan's offer to the New Zealand Company to work his process in New Zealand, with their assistance.

1842 - Charles Terry, Francis Dillon Bell and Frederick Young recommended cultivation.

1842 - Several flax-dressers reported to have settled in Wellington and Nelson.

1843 January - For the National and New Zealand Hemp and Flax Company Donlan negotiated with the New Zealand Company.

1843 May - Botanical Gardens and Horticultural Society set up in Wellington.

1843 May - Charles Terry and Colonel Thomas set up a fibre factory in Auckland.

1843 May - Meeting in Nelson; high cost of production and low prices regarded as the chief obstacle to progress.

1843 September- For the New Zealand Flax Importation Company Donlan sought concessions from the New Zealand Company.

1843 - Use of native processes for a 'cottage' industry.

1844 November - Simple machine for a child to use was designed.

1845 January - Luke Nattrass, a flax dresser, arrived in Nelson to try Donlan's methods in New Zealand.

1845 - Flax tested and reported on by the Belfast Flax Improvement Society.

1846 - French inventor sought a trading agreement with the New Zealand Company for using Phormium.
1849 July - Henderson at Wanganui claimed success in dressing Phormium, using alum.
1849 November - At a meeting in Wellington the Wellington New Zealand Flax Company began.
1850 - Ropes were made and supplied to colonial shipping at Nelson.
1852 - The Chevalier Claussen in England was reported to have solved the problem of preparation by steeping the Phormium leaf.
1854-1856 - Some increase in trade due to the Crimean War.
1855 September- Rev. Richard Taylor noted the Prince Consort's interest in Phormium tenax.
1855 - Mattrass reported success in producing better fibre, and in obtaining a reasonable market price in London.
1856 March - Nelson Provincial Council motion to assist in the invention of a machine was lost.
1856 August - The New Zealand Government offered rewards for the successful economical preparation of Phormium tenax.
1857 - James Busby proclaimed Phormium tenax as the only possible economic staple New Zealand would ever have.
1858 August - Taranaki interest in a new English machine.
1859 March - Dr. Kingdon sought to set up a company in New Zealand and England to exploit Phormium.
1859 September- Founding of the Nation Flax Company Limited.
1860 May - A permanent London market in Phormium tenax was reported to have been established.
1861 February - McDonald's machine "perfected".
May - Purchas and Ninnis Flax Patent of their machine.
August - Controversy over paper-making qualities of Phormium.
September- Government awards announced - extended to 1866.
October - Wm. Bentham & Coy.'s mills destroyed; they seek public assistance to recommence activities.
October - Whytlaw's pamphlet on the lateral dressing of Phormium.
1862 - Markets in England and Australia reported to be improving.
1863 - Interest in Phormium tenax revived.
1863 August - Prospectus of the London "New Zealand Flax, Hemp and Cordage Company" of £15,000.
1863-1864 - Investigations and experiments by Dr. J. Hector and Mr. W. Skey in Dunedin; they experimented with chemicals.
1865 August - Fiasco company effort at Port Chalmers. (Typical.)

1866	March	- McMillan's "cow-dung" method; praised by papers.
	May	- Wellington Independent's sober warning against too much optimism.
1867		- Interest in linen flax recorded in Otago.
1867	September	- Auckland Flax Hackling Society commenced work.
1868		- Dr. Purchas' lecture to Auckland Philosophical Institute on Preparing Phormium; Mr. Travers to the Canterbury Institute on its utilisation.
1868	October	- Matting made at Tokomairiro (Otago); also the first woolpacks.
	December	- Matting made at Taieri for the Otago Provincial Council Chamber.
1868		- Suggestion of Phormium tenax as New Zealand's third staple export.
1869		- Mr. Nottidge to the Canterbury Philosophical Institute on the Structure and Colour of Phormium: Captain Hutton on Structure, and Colonel Heaphy on Maori Methods to Auckland Institute.
1869		- Improvement and increased demand on British market.
1869	July	- Mills' improvements on Price's machine.
	August	- Resolutions in Parliament to set up a Flax Commission.
	September	- Plea for the withdrawal of machine patents.
	October	- Patea Flax Dressing Company's Prospectus.
1870		- Wellington Philosophical Institute meeting for discussing Phormium, led by Dr. Hector: Mr. Kirk to the Auckland Institute on Potentialities.
1870		- Slump, closing mills, insufficient supplies due to lack of cultivation; market improved later.
1870		- Canterbury Flax Association founded, and functioning vigorously.
1870		- Controversy over the combustibility of baled fibre.
1870	February	- First joint testing of various machines in Auckland.
	July	- Flax Commission Report presented to Parliament.
	August	- Select Committee on Flax Exhibition and Commission.
	September	- New Flax Commission set up.
1871		- Flax Exhibition and investigations by Commission.
1871		- J. Vogel's co-operation with Commission in England, and the United States of America.
1871	August	- Vogel's Report to the House of Representatives on his overseas tour; Phormium included.
	December	- Collectors of Customs notified to act as graders of export fibre.
1872		- Colonel Haultain's lecture to the Auckland Philosophical Institute on the 1871 Flax Commissioners' Report.

A B B R E V I A T I O N S.

Hist. Rec. of N. Z.	- Historical Records of New Zealand.
Hist. Rec. of N.S.W.	- Historical Records of New South Wales.
C. H. B. E.	- Cambridge History of the British Empire.
Proc. C. M. S.	- Proceedings of the Church Missionary Society.
Hock. Lib.	- Hocken Library.
MS.(MSS.)	- Manuscript (Manuscripts).
Pl.	- Plate.

CHAPTER I.

BOTANY AND INTRODUCTION.

Before *Phormium tenax* can be discussed - historically, economically, industrially, or from any other aspect - one needs to enquire into the nature of this plant which has provoked interest for the last one hundred and eighty years. It is worth noticing that many of the mistakes made when men were describing the potentialities of Phormium were due to a lack of understanding of the botany of the plant, and the nature of its products. Men were influenced by what they thought *Phormium tenax* to be. It was not until the Commissioners of 1871, under the direction of the General Assembly of the New Zealand Government, had the microscopic and chemical nature of Phormium reliably investigated by experts in England that many of the erroneous opinions regarding the description of New Zealand flax were finally discredited and displaced.(1) One very interesting example of the current false ideas of Phormium arose regarding the use of ropes made from a mixture of *Phormium tenax* and manila hemp. The controversy was concerned with answering the question, 'Which fibre stretched more, Phormium, or manila?' It was held by one body of opinion that the ropes were a failure because the Phormium would not stretch and the manila hemp did: the other party contended that exactly the opposite properties in each material caused the failure of the ropes. Both these opposing views, however, did agree that a mixture of both kinds of hemp was unsatisfactory. Even this was opposed by an eminent Scottish rope-maker, Mr. Lockhart of Fife, who expressed in a Nelson paper in 1871 his favourable opinion of rope manufactured from a mixture of manila and Phormium.

(1) J. Hector: *Phormium Tenax as a Fibrous Plant*, pp. 91f, 104f, under appendix "Special Reports". These reports have been superceded by later reports on further experimentation; C.W.Brandt, "Chemistry of Phormium tenax", in *New Zealand Journal of Science and Technology*, Vol. 18, No. 8, p. 614.

This sort of confusion was all too typical of the atmosphere in which the colonial flax-grower and miller had to work. It was no wonder that there was a distinct decline of interest while this and other controversies were being decided.

Throughout the history of European interest in Phormium tenax, both in the plant and in the fibre, the precedents set by Maori usage were carefully examined. The Pakeha was guided in his choice of varieties by those which the Maoris selected and used. Thus was aided the work of selecting and cultivating the plants which would yield the best fibre for the English market and, later, for local factories. An excellent example of this influence is contained in Captain F. W. Hutton's lecture to the Auckland Institute in 1870 on "New Zealand Flax". There he had occasion to observe:

> "It is of considerable importance that the existence of these two kinds of Phormium (P. tenax and P. colensoi) should be recognised; for as will be seen they produce fibre of very different strengths... the flax plant on Norfolk Island generally grows on the sea cliffs, and it is therefore possible that it may be Phormium colensoi, and not Phormium tenax; which would be sufficient to account for the failure experienced in trying to produce fibre from it, for the fibre of Phormium colensoi breaks off so short that the Maoris never attempt to prepare it." (2)

For long enough the term 'flax' has been applied very loosely to Phormium tenax as well as to the Irish linen flax. The plants are not in the least alike, however, and are in no way related. The confusion

(2) F.W.Hutton: New Zealand Flax: its Manufacture, p. 6. Later investigation showed that the flax on the cliffs of Norfolk Island is Phormium tenax: Captain Hutton was mistaken in assuming that it was Phormium colensoi because it grew on the cliffs and was of poor quality. The unsuccessful attempts on Norfolk Island, undertaken by Governor King in 1793, are dealt with later, in Chapter III.

arises through the use of the common term 'flax'. This comes from an Anglo-Saxon word meaning to plait or weave, and is aptly applied to the plant which provides linen thread. One thing linen flax and Phormium tenax have in common - their fibres are white in colour. It is little wonder that when the early visitors to these shores saw the Maoris using this white thread, they called it flax, and not unnaturally dubbed the plant, from which the fibre came, the same. The uses and general appearance of the two fibres were not unlike on casual observation: the plants had no resemblance whatever to each other.

Linen flax (Linum usitatissimum) and Phormium tenax are not related botanically. Linen is a dicotyledonous plant, placed in the family Agavacese in the most recent classification. There are, of course, relationships within the orders quoted, but it would be as correct to say that Phormium is related to the rushes, as to say that Linen is related to "Oxalis" and "Geranium". The major difference is that they belong to different Classes of the Plant Kingdom - Dicolyledons and Monocotyledons. Irish linen flax grows to only about three feet, whereas New Zealand flax may attain a height of eleven or twelve feet. The fibre is obtained from the bark of the stalk of European flax; but in Phormium tenax there is no such bark, nor even a stalk, and the leaf is fibrous throughout. The best fibre of Phormium is as long as the leaf.

On their visits to New Zealand, Cook and his companions noted

that there were two species of Phormium plant abundant in New Zealand. These have been referred to in Captain Hutton's remarks, - Phormium tenax and Phormium colensoi. Banks observed that one kind had a dark flower while the other had a yellowish one.(3) Phormium colensoi is smaller than Phormium tenax; the leaves often droop instead of standing erect; the flowers are smaller and range in colour from honey to mahogany instead of being of dark cedar hue as in Phormium tenax. The seed capsules of Phormium colensoi droop, are green, and are twisted or 'corkscrewed'; those of Phormium tenax are erect, shorter, straight, and of dark colour. Phormium colensoi prefers a drier climate. Where the two species are found together they will hybridise.

Phormium tenax can be very deceptive in looks. An area of what looks to be of very good flax, standing ten or eleven feet high, may strip out with fibre only about a foot in length, and of coarse quality; while another area, growing only five to six feet tall, may produce fibre from four to six feet long.(4) One generalisation regarding varieties may be made. Very often the shorter the leaf is, the longer is the fibre which can be produced. Swamp flax of the poorest quality is renowned for its prodigious growth. To the end of finding the reason for this phenomenon, and the reason for the apparent inferiority of Phormium to manila fibre, much work has been done on the scientific examination of the fibre. Numerous persons have suggested reasons, and

(3) J. Banks: Journal during Captain Cook's First Voyage, 1768-71, p.229.
(4) When the writer visited the Phormium plantation at Moutoa, South Manawatu, this was illustrated from the selected varieties (of shorter stature and longer fibre) and the swamp flax (some ten feet tall with only two-foot fibre when hand stripped).

have carried out experiments to prove their theories - generally they have been disproved. By 1870 the most of the problems seemed to have been solved, but unanimity concerning the 'findings' was lacking; and today botanists are still investigating the botanical structure of Phormium tenax.

Captain Hutton seems to have been one of the first to describe in detail the composition of the fibres of Phormium as shown by investigation under a microscope:

> "Throughout the whole leaf, bundles of fibres are found lying parallel to the midrib. These fibrous bundles are composed of numerous elongated cells, called the ultimate fibres, which lie parallel to one another in the direction of the length of the bundles. These cells are not joined end to end, but are quite distinct from one another. They are in the form of long, hollow cylinders, gradually tapering towards each end, which is pointed and closed in by the cell wall (sic): they do not vary much in thickness in the different varieties, or in different parts of the same leaf, being from 1/2500th of an inch to 1/1500th of an inch in diameter, and from 1/8th to 4/5ths of an inch in length; the average length being about 3/8ths of an inch. They lie closely packed side by side, with the ends overlapping each other, and adhere together by a kind of gum or cement ... It will be seen that the strength of the fibrous bundles depends upon the cement that holds the ultimate fibres together; and if this is dissolved, either by hot water or by alkali, the whole would separate into a mass of fluff, with no coherence or strength, the fibres of which it was composed being under half an inch in length". (5)

Even this account, however, was not without blemish. The idea that the fibres (i.e. the ultimate fibres) were held together by a kind

(5) F.W.Hutton: op. cit., pp. 7, 9. Detail on this is to be found in the Transactions of the New Zealand Institute, Vol. 2, pp. 108, 111.

of cement was later confuted by the Professor of Botany at the Royal Agricultural College at Cirencester, Professor W. R. McNab, in his report of 1871 to the New Zealand Flax Commissioners of 1871.(6) Professor McNab stated that the cohesive force in the fibre of Phormium, among the ultimate fibres, was the cell wall, no cement being present, save a gummy substance existing on the epidermis of the leaf. (7)

One of the obvious questions facing those interested in the production of Phormium tenax was that of finding how manila hemp differed from (and was said to surpass) Phormium. Here again the work of Captain Hutton was important, and was quoted by Dr. Hector in his report for the Commissioners of 1871:

> "'The following table gives the average dimensions of the different ultimate fibres, made from a considerable number of measurements of each kind:-

	LENGTH			DIAMETER			THICKNESS
	Max.	Min.	Mean	Max.	Min.	Mean	of cell wall
Sisal	.25"	.20"	.21"	.00140"	.00098"	.00112"	.00028"
Manila	.25"	.17"	.21"	.00098"	.00060"	.00083"	.00024"
Phormium	.80"	.13"	.39"	.00070"	.00035"	.00045"	.00015"

> The evidence adduced by Captain Hutton... did not, however, meet with universal acceptance..." (8)

It was evident from this table that for length of fibre, Phormium was superior to sisal and manila, but in the thickness of the cell wall it had its weakness. Professor McNab found that the best fibre was that

(6) J. Hector: Phormium Tenax as a Fibrous Plant, p. 91, under appendix "Special Reports".
(7) This gum caused a great deal of trouble in the manufacture of rope because it was said to make the fibre brittle when twisted. Much time, energy, and money were spent in trying to eliminate this detracting feature from Phormium rope.
(8) Ibid., p. 74f.

which had the smallest cavity and the thickest cell wall. (9) The trouble with Phormium was that, while it was finer (of smaller diameter) than the other fibres, it still had a cavity inside, which left the cell wall very thin indeed - only two thirds the thickness of manila.

Within the species Phormium tenax, there are many varieties which have numbered as many as thirty under some classifications. Within this species, therefore, there is almost as much variation in quality as there is between the fibre of Phormium and of manila. Some have tried to classify the varieties according to appearance, but this is a very imperfect method, as the colour and appearance of a leaf of Phormium may vary within its own length. Not only, however, does the appearance alter within the leaf, from the base (or butt) to the tip (or tail), but also the fibre within the one leaf varies in quality. At the tail the fibre may be older, harsher, and more brittle than at the butt where one would find it new, soft, weak, and coarse, tending to be pulpy, surrounded by a great deal of mucilage. After the leaf has been cut, very quickly a new one appears and grows rapidly. It was thought by many early experimenters that, because of this rapidity of growth after cutting the flax could be cropped annually. This, however, is not the case. The interval of one year has been found to be too short a time for the fibre to mature. With only one year's growth the fibre is weak and difficult to separate from the mucilage. Indeed it is doubtful whether

(9) J. Hector: op. cit.

such a young plant could be stripped efficiently, even with modern machinery. The plant should be cut every four years.

How to improve the quality of the fibre was the constant quest for all those interested in Phormium. Cultivation - a topic which must be considered more fully later - seemed to be the obvious method, and one which the Maoris had used, though not extensively. The basis of the development effected by the Maoris was selection of better plants. Cultivation to them was a secondary contribution so far as improvement of quality was concerned. The Pakeha found that improvement of drainage alone made unexpected advances in the quality of the flax. Unlike 'Typha' or Raupo, Phormium's near neighbour in the swamp-lands, the flax needs a period of dry summer weather as well as plenty of moisture. Thus, drainage of swamp-lands was advantageous for producing Phormium tenax; and at the same time it discouraged the growth of raupo. This is interesting and important because many early commentators on the New Zealand flax-plant were given to remark that the leaves could be harvested for the cutting, and good fibre obtained, without any interference with the native state of the plant. It seems, however, that for the gathering of a larger and better harvest, a little care and cultivation would pay the farmer a hundred-fold. This truth came to be realised, and there was a campaign in 1842 for cultivating the better varieties. This was advocated by Messrs. F. Dillon

Bell and F. Young, who wrote a pamphlet entitled: "The Reasons for the Cultivation of New Zealand Flax".(10) There they outlined the importance for the industry of such attention to the growing of the plant. In 1871 there was a serious depression on the Phormium market, and the Canterbury Flax Association, founded in 1870 by interested parties, advocated, not only the cultivation of flax, but also the supplying of finance by the General Government of New Zealand for such experimentation. Furthermore, the committee of the Association set up to consider methods of cultivating Phormium, resolved to call tenders for cultivating an acre of seedlings until they could be transplanted. They offered prizes for improved fibre.(11) But it ought never to be forgotten that the quality of Phormium fibre is an inherent character, not always associated with vigour of growth and splendid appearance. More important than cultivation always must be the careful selection of the best varieties.

Modern botanical advances, however, have been made only because, from the time when the first white man set foot on New Zealand shores, and observed the nature of the flora of this new country and the dress and habits of the Maoris, there have always been those who were inspired by the possibilities of using Phormium tenax. It is with these men and their writings that the following pages are concerned, and with the reactions of the readers of those accounts of the New Zealand flax plant and its fibre. Therefore this discussion must begin with Captain Cook.

(10) F.D.Bell and F. Young: Reasons for the Cultivation of New Zealand Flax, passim.
(11) Canterbury Flax Association: Information on the Utilisation of Phormium Tenax, passim.

Cook was not out for trade, but came across the ocean on a voyage of discovery and science. The accounts contained in his and his companions' journals are the first written concerning the New Zealand flax plant, Phormium tenax. James Cook, Sir Joseph Banks and Dr. Solander recorded their discovery of the flax plant on their first voyage to New Zealand in 1769: they described the external appearance of Phormium, remarked upon the extensive use to which the Maoris put both the plant and the fibre obtained from it, and passed on to observations of other things they saw about them. Their accounts, however, were sufficient to kindle interest elsewhere. All three mentioned here agreed - as did many visitors after them, for example, Forster - that the object of their discovery should be better known. Both Cook and Banks saw in Phormium a great asset to England; and Banks even advocated its transplantation to the Homeland. While in New Zealand he bartered with the Maoris for some Phormium green leaf and dressed fibre.(12)

The comments of these men may seem to have been over-estimated, but the impact of such comments upon the English community eventually helped to stimulate widespread interest and activity in the islands of New Zealand. Such remarks as those of Cook and Banks contained the germ of many hopes and misconceptions - the impression that Phormium was a valuable plant which would thrive in land of little value for other purposes. Nor were these remarks drafted solely by English pens.

(12) J. Banks: Journal during Cook's First Voyage, 1768-71, p. 229.
J. Cook: "Journal" - Cook in New Zealand, p. 140. (ed. A.H. & A.W.Reed)

The French, too, were active in the Southern Pacific at the same time,(13) no fewer than three expeditions appearing on the northern shores of New Zealand in the years, 1769-1772. A little later, Labillardière, one of the men sailing with D'Entrecasteaux in search of La Pérouse, obtained samples of Phormium which he took to France to cultivate and examine. From these investigations he produced what was called "the first scientific account of Phormium tenax". He did what Banks suggested; he imported the plant into Europe - only to France instead of England.

Hopes of using New Zealad flax for commercial advantage were thus raised and can be seen in the letters of Lieutenant-Governor King of Norfolk Island (and later, Governor of New South Wales) to the Imperial authorities in the years 1791-1807. No sooner, however, had this interest been kindled than difficulties, which constantly harassed would-be manufacturers for a century, were revealed. How was the fibre to be efficiently and economically separated from its epidermis, and from the gummy mucilage found throughout the leaf? The native methods were tedious and uneconomical - though more efficient than the earliest machinery used by Europeans. Because of this problem many attempts to utilise "so useful a plant" (as Banks had called it) met with disaster. Consequently it became common to deride those who still hoped for a solution to the problem of manufacturing Phormium fibre: it was con-

(13) The French expeditions were all bent on advancing science and commerce.

sidered useless by many people. Some of the official reports of the Navy Board and of naval men asked to test ropes, cordage, and sails manufactured from Phormium tenax, were among the most despondent. The New Zealand flax was the cause of several departmental 'wrangles' in the eighteen-twenties and 'thirties. Competent officials could not agree in their evaluations of Phormium.

For what reason, it is difficult to say, but despite the multitudinous difficulties faced and unsolved, there continued to be a growing trade in Phormium tenax from New Zealand shores, from the last decade of the eighteenth century. At first there were just a few hanks of native-prepared fibre, and a few bundles of green leaf exported - cargoes on which to experiment in Sydney - but gradually partial success was achieved and men applied to the Governor of New South Wales for permission to establish factories on the coasts of New Zealand, especially around the Bay of Islands, the Thames estuary, Cook Strait, and Foveaux Strait.

Much of what was exported to Sydney was thence trans-shipped to England. There, experiments were almost continuously being carried out on Phormium fibre, for example the efforts of Mr. M. J. J. Donlan for forty years. Although the Navy reports were not always favourable, nor naval opinion encouraging, many experimenters persevered, even to the extremes of facing bankruptcy. In the sphere of naval stores, the competition for raw materials was acute. British supplies came from the Baltic, chiefly from Russia; and her dependence upon such sources was

felt to be an embarrassment. Nevertheless, Phormium ropes had to prove themselves against the well-tried manila hemp ropes. The rivalry of these two cordage materials is the theme of the story of the vicissitudes of Phormium tenax on the English market.

Despite adverse naval opinion, there were some English statesmen who were looking to New Zealand flax as a potential source of wealth to England; and it is said by at least one interested author that it was largely this consideration which influenced Lord John Russell to enfold these islands within the British Empire.(14) Colonisation was influenced by the schemes of men to tap this "indigenous production" of New Zealand as is discussed in the fifth chapter below. Still later, Phormium tenax exerted its influence upon the public mind in the setting up of an institution such as the Canterbury Flax Association (founded in 1870), in the numerous lectures delivered to various societies on the nature, cultivation, manufacture, and importance of Phormium, and in the halls of both the General and Provincial Governments of New Zealand.

The developing interest taken in this native plant of New Zealand increased, sometimes rapidly and at others slowly, in ever-widening circles of influence, capturing more and more of men's attention. In the succeeding chapters this is demonstrated by detailed reference to the interested parties. In 1770 Sir Joseph Banks hinted at the import-

(14) M.J.J.Domlan: Observation on New Zealand Flax and the New Zealand Company, p. 3. - written November 1831. - "The flourishing statement upon the merits of the indigenous productions of New Zealand, including this flax, to the Secretary of State for the colonies (Lord John Russell), was (sic) no doubt a strong inducement for that noble man to incorporate New Zealand as a colony under British dominion.."

ance of "so useful a plant" to the seafaring nation of Great Britain: in 1870 the Professor of Chemistry at the Royal Agricultural College at Cirencester, Professor A. H. Church, asserted that his intensive investigations were but a "preliminary enquiry".(15) In the century which had elapsed much ground had been covered; from a casual observation of the plant and its products, the Pakeha had proceeded by degrees to a detailed scientific investigation of Phormium tenax.(16) To trace these developments and their influence on New Zealand is the orbit of this discussion. But the year of Cook's arrival in New Zealand, or the date of Tasman's brief visit to these shores, cannot be the starting point for a discussion of Phormium, and its importance to New Zealand. It was important to the Maoris, supplying them with the equivalents of our wool, cotton, string, rope, and even nails and screws. It is no wonder that the Maoris selected the most valuable varieties of Phormium with care. On this plant and its raw material so much of their everyday living depended - for clothing and comfort, for food and shelter. Therefore, it is well for this study to commence with a discussion of the importance of Phormium tenax to the Maoris, to which consideration we now proceed.

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(15) J. Hector: Phormium Tenax as a Fibrous Plant, p. 104f, under appendix "Special Reports".

(16) A survey of the advances made was given by J. Hector: op. cit. - This was the report of the Flax Commissioners of 1871 to the New Zealand Government.

CHAPTER II.

THE MAORI USAGE.

This discussion of the uses to which the Maoris put Phormium tenax is not meant to be a comprehensive study of the Maori plaiting, weaving, and rope-making arts, nor an attempt to trace the development of techniques from the time of the arrival of the Maoris in New Zealand. Rather this chapter is to be devoted to a consideration of the Maori employment of this plant and its fibre in order that some idea of the importance of this material may be obtained, and that we may appreciate a little better the influence that the use of Phormium by the Maoris had on the early visitors to New Zealand, and on the subsequent interest shown in this country and its indigenous productions which are discussed in the following chapters.(1)

How important was Phormium tenax to the Maori? It has been said that it "so entered his daily life that one of the early Maori visitors to England, when he found that the New Zealand flax did not grow there, wondered how it was possible to live in a land so unfortunate".(2) In what manner, and for what purposes then, were the fibre and the green leaf of Phormium used? The early observations of some of the first visitors to these shores record the diversity of ways in which Phormium was used by the Maoris. Captain Cook noted the dress which he described as "uncouth" at first sight, yet very serviceable and durable: Sir Joseph Banks drew

(1) This is not to be taken to show any lack of interest by the writer in this subject; rather it is an acknowledgement that its scope is so wide and engrossing that it constitutes a study in itself - such a study as could not possibly be attempted here.

(2) A. Hamilton: Illustrations of Maori Art, p. 271. For studies on the Maori textile crafts see: P.H.Buck: "The Coming of the Maori and The Evolution of Maori Clothing; also E. Best: The Maori and A. Hamilton: Illustrations of Maori Art.

attention to Phormium's important products for the Maoris. More light is shed upon the value of Phormium tenax to the Maoris by a brief consideration of the needs of this people upon arrival in New Zealand after their great migration from their island home in Polynesia.

In the tropical climate of Polynesia the habit of wearing clothes was conditioned solely by the notions of modest decency and ceremonial propriety as viewed by the Polynesians. New Zealand's climate provided a new problem. In Polynesia a kind of loincloth for men, and a skirt for women had been adequate for everyday use, but the temperate climate was too severe for such meagre dress.(3) If one got wet in the tropical climate, there was little fear of catching a chill in consequence, but in New Zealand there was every possibility. One of the first and most important garments found by the Maoris to be necessary in their new country was one which would serve the dual protective purpose against rain and temperature.(4) In Polynesia the materials from which dress was made were chiefly the 'Aute' or paper-mulberry, and coconut and pandamus leaves. In New Zealand these materials were lacking and accordingly the immigrants had to find a new 'cloth-making' material. There is evidence that they brought some Aute plants (or seeds) with them and attempted to cultivate them in Hawke's Bay, in the area now known by the

(3) For ceremonial occasions the Tahitians wore elaborate dress like that of the Maoris. This can be noted in Webber's sketches made during Cook's third voyage; J. Webber: Views in the South Seas, Illustrative of Captain Cook's Voyages, 1776-1780, the frontispiece, "Boats of the Friendly Islands", plate V, "A View in Oheitepeha Bay in the Island of Otaheite". It is interesting, in the light of P.H.Buck's comments (The Coming of the Maori, pp. 158, 160) to compare these plates with Webber's sketch of Queen Charlotte Sound, New Zealand (ibid, Pl. I).

(4) P. H. Buck; The Coming of the Maori, pp. 158, 160.

name, Te Aute, some fifteen miles south of Hastings.(5) This experiment was a failure; and the Maoris were thrown back on the indigenous plants of New Zealand. They found that their very early Polynesian forefathers in New Zealand had been using Phormium tenax. This the Maoris of the great migration also adopted for both plaiting and weaving, improving on former methods.

The articles for which Phormium tenax was used will give the best indication of the importance of that material to the Maoris. All cloaks, mats, belts, kilts, and headbands - even dogskin cloaks worn by chiefs on special occasions - were made of Phormium, or had that material to form the ground-work of the garment. The extent to which these garments were worn may, in part, be indicated by the number of types of garment under each classification of Maori dress given by A. Hamilton - thirteen types of fine-dressed mats; ten of rough, hard-wearing cloaks; seven of aprons worn by women and girls, seven of waist mats or kilts, worn by both men and women; five types of waist girdles or belts. It will be noticed that this does not include the special ceremonial dress of the different classes of Maoris. There are listed no fewer than ten different pattern names used in designs for baskets, sleeping-mats, and belts.(6)

Plaiting and weaving into types of mesh and cloth, however, by no means cover the Maori arts employing Phormium tenax. For procuring

(5) The plant Aute was shown to Banks when he was in New Zealand, recorded in Banks' Diary, p. 206, on 2 December, 1769, where he noted that it had the same name, appearance, and purpose as that he had seen in "Otaheite" (Tahiti). Reference to this is made in the Journals of the Polynesian Society, Vol. 7, p. 116.

(6) A. Hamilton: op. cit., Part IV, passim.

much of the food of the Maoris good fishing nets and lines were necessary; strength and durability were important considerations in their manufacture. W. J. Phillips, in this "Notes on Maori Plaits", (7) gives a fairly detailed description of the various kinds and techniques of plaiting as practised by the Maoris, especially those used in making cordage and fishing tackle, both lines and nets. Great skill must be exercised in making a net half a mile long. An inferior article would be worse than useless to the natives when fishing. Not only did the Maoris place great faith in Phormium lines, but later it will be found that the whalers around these shores and stationed in Australia praised Phormium cordage used for their fishing tackle.

There is a tale told, of a Maori on D'Urville Island making himself a canoe, where notice is taken of the very careful preparation of the flax which was used to lash on "the raised gunwales, figurehead, and sternpost of his canoe.(8) One look at the construction of a Maori canoe will reveal the importance of the lashings holding the above-mentioned heavy and necessary portions of the craft. Thus it can be seen that Phormium was important to the Maoris in the sphere of transport.

Naturally, a great deal of attention was given to the preparation of the material from which so many of the necessities of life were manufactured. Cloaks needed to be warm and weather-proof; mats ought to be well finished and serviceable; nets and lines must be as strong and

(7) Journals of the Polynesian Society, Vol. 59, p. 261 f.
(8) The tale was told by Archdeacon Grace: Journals of the Polynesian Society, Vol. 10, p. 65.

durable as possible. In Lieutenant-Governor King's Journal for December, 1791, there appears a comment upon the Maori method of manufacture which proved to be altogether erroneous:

> "When I was last in London, Sir Joseph Banks shewed me a quantity of flax, which he had obtained from the natives about the Bay of Islands; and the great quantity which he got, in exchange for trifles, is a convincing proof that their methods of preparing it must be extremely expeditious and simple..."(9)

This was very far from being the case.

Women, often slaves, were always employed in the manufacture of the fibre and of the garments or other products from the flax.(10) Many of the men, especially those of higher rank, were practically ignorant of the processes involved. This was clearly illustrated when two natives - one a warrior, the other the son of a native priest - were captured by Lieutenant Hanson of the store-ship "Daedalus" and carried to Norfolk Island to teach the Europeans there, mostly convicts, how to dress the New Zealand flax. The task of dressing the flax and manufacturing the fibre was considered by the Maoris to be very menial as well as arduous - something to be dodged if possible.

Among the records of early European visitors to New Zealand there are several accounts of the processes involved in the native preparation of Phormium tenax; all of them more or less agree.(11)

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(9) King's Journal, McNab: Historical Records of New Zealand, Vol. 2, p. 536.

(10) G. Bennett: Wanderings in New South Wales..., 1832-1834, p. 76.

(11) Two of these come from Norfolk Island; Dr. Jamieson, assistant-surgeon to the convict settlement, in a letter dated 19 November, 1793, (Hist. Rec. of N. Z. Vol. 1, p. 182): Lieutenant-Governor King, "Condition of Norfolk Island", 18 October, 1796 (ibid, p. 215f).

Further accounts of the methods of production are given by more recent writers who have studied Maori culture and may be relied upon for an accurate account.(12) Of these latter, one of the greatest authorities, the late Sir Peter Buck, has given a comprehensive yet succinct outline of the method of stripping flax employed by his own people. Both the processes commonly used by the Maoris - haro or tika, and takiri - are explained by Buck. In the former process, haro or tika, performed on what may be regarded as the 'second grade' flax which was most commonly found, the cut flax leaf was split longitudinally and then cut slightly about half-way down the leaf on the posterior or outer side. The shell used for the cutting was then placed under the cut, on the anterior or inner surface of the leaf, and pulled firmly along that surface toward the end. This caused the posterior side of the leaf, to the depth of the cut, to peel off. The same was done with the other half of the leaf. The epidermis of the anterior surface, surrounding the flax fibre, was scraped away with the shell: this was the hardest and most skilled part of the process. If any of the epidermis remained the fibre turned a yellowish colour, and was of inferior quality. But little fibre being found on the posterior side of the leaf, it was not processed further, but frequently was used for the 'waterproofing' tags on rain cloaks. The alternative takiri process was employed only on

(12) E. Best: The Maori, in two volumes.
A. Hamilton: Illustrations of Maori Art.
Te Rangi Hiroa (P. H. Buck): The Coming of the Maori.

special kinds of flax, the 'first grade' leaf, where the inter-fibrous material was easily separated from the fibre. Stripping with the hands was all that was necessary; but such as was done had to be skilfully executed.

To strip the superior quality flax an incision was made in the leaf as for the haro process, and the leaf coaxed to split a short distance. The two portions were then grasped firmly and torn apart. With good flax the fibre would strip practically the whole length of the leaf.

After stripping the flax, the Maoris would beat and wash the fibre of the anterior portion of the leaf to remove the inter-fibrous glutinous material from the fibre. It was then rubbed between the hands to separate the fibres and dried and hanked. Beating and washing was said to render the fibre softer for weaving and of whiter appearance as it removed the natural silky sheen.(13)

Through many years of constant practice, improved methods of 'manufacturing' the green leaf of Phormium into fibre were devised. Advances on the methods of the early Polynesians in New Zealand and the Morioris in the Chatham Islands were made, though fundamentally their techniques were the same, since they all used Phormium for clothing purposes. By the Morioris "the fibre was scraped - it was not twisted

(13) P. H. Buck: The Evolution of Maori Clothing, p. 61-63. - Also an article by the same title in Journals of the Polynesian Society, Vols. 33, 34, 35.

or beaten like the Maori method, with two beatings - but the garment was somewhat stiffer..."(14) Even some of the Maori garments were stiffer than others, a feature no doubt due to incomplete stripping, or insufficient beating of the flax.(15) The beating was done with a stone pounder, generally round and long like a truncheon with a shaped hand-piece. Here again the importance of the art of 'manufacturing' Phormium fibre and articles therefrom may be seen by the fact that W. J. Phillips in an article "An Introduction to Maori Pounding Implements", remarks:(16)

> "The pounding tasks of the Maori were numerous and varied. Probably the most important was the pounding of flax-fibre to give it flexibility, lustre and beauty .... The glossy and pliant nature of the flax-fibre after being beaten with one of these patu makes all the difference to the texture of the future garment." (17)

As the Maoris became more adept in the use of Phormium tenax, they naturally developed new styles of dressing the flax, trying to improve its appearance, preserve the strength of its fibre, and produce a higher quality article. The development of patterns, of different styles of plaiting, of double and even interwoven wefts in weaving - all these improvements in their art - took time and skill to accomplish; but by the time the Pakeha appeared in numbers off New Zealand shores these

(14) Ibid. This information was given Buck by Elsdon Best, taken from an unpublished MS. of John White who gives no source for his remark upon the Morioris.

(15) Mentioned by the Frenchman, L'Horne, visiting New Zealand, in December, 1769 - Hist. Rec. of N. Z., Vol. 2, p. 319.

(16) Journals of the Polynesian Society, Vol. 48, p. 71 ff. a patu muka, or pounder, can be seen in the Maori Section, Otago Museum, Dunedin - Exhibit D26.1027.

(17) Why, I cannot discern, but it is evident that Buck and Phillips disagree regarding the effects the pounding has on the colouring of the fibre. Buck maintains that by the pounding the fibre loses its natural sheen; and Phillips that by pounding the fibre the glossy appearance is produced!

arts were fairly highly developed, as may be seen in the various articles of Maori clothing displayed in Museums throughout the country. A good collection is exhibited in the Otago Museum, not only of cloaks and kilts of various kinds, but also an exhibit illustrating the methods employed in Maori finger-weaving.(18)

Often remarks of praise for the improvements made by the Maoris in the dressing of Phormium tenax have been opposed by sentiments such as Cook's that the clothing of the natives was "uncouth". So it was; but, as Sir Peter Buck has pointed out, there was no sense in wearing one's best clothes all the time - no more so for the Maori than for the Pakeha! Rough garments were generally worn, but the real progress was made where the true art of manufacture lay - in the making of 'best' clothes, the ceremonial cloaks, mats, kilts, head-bands and belts. Even the rough garments, however, were very serviceable as Captain Cook also pointed out:

> "When they (Maori men) have only their upper garment on (Rain cloak), and sit upon their hams, they bear some resemblance to a thatched house; but this covering, though it is ugly, is well adapted to the use of those who frequently sleep in the open air, without any other shelter from the rain."(19)

In his book, Adventures in New Zealand, 1839 to 1844, E. J. Wakefield described Maori dress and gave an account of the Maori rain cloak referred to by Captain Cook. As Sir Peter Buck explained the use of the posterior

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(18) Having no device like a loom, the Maoris had no shuttle either and had to weave with their fingers. Their weaving is described later.

(19) Captain Cook's Journal, March 1770 - J. Hawkesworth: Account of Voyages for Discoveries in the Southern Hemisphere, Vol. 3, p. 454. (This volume is devoted to Cook's voyage.)

side of the leaf of Phormium, so did Wakefield, adding, "I have often braved with impunity the heaviest rain, sleeping under no other shelter" than the native rain cloak.(20)

Some of the first Maori garments to attract the attention of early visitors, however, were the dogskin cloaks worn by the chiefs on special occasions. (Naturally they counted the visit of the white man as a special occasion, and thus the dogskin cloak became conspicuous to the visitors.) These garments, though of dogskin, and highly prized, were held together with Phormium tenax. The skins were sewn together in half-inch to two-inch strips with the thread of Phormium, and were attached to a Phormium-cloth base. Over the manufacture of these garments much care was taken, as indeed was the case with all ceremonial wear. As has been indicated, only the chiefs wore these dogskin cloaks; and by the French visitors they were singled out and commented upon.(21) The warriors wore no more than the kilt, or even just a belt (for decency) around their loins - the latter is described by M. L'Horne. Very often, however, as Captain Cook indicated, the lower full-dress garment, the kilt, was discarded, and only the belt and rain cloak were worn. These garments were always draped according to the occupation of the wearer, to allow full use of the limbs at work or at battle. The women generally wore their upper garment over their left shoulder or hitched up under the armpits if both

(20) E.J.Wakefield: Adventures in New Zealand..., Vol. I, p. 62.

(21) Messieurs Monneron and L'Horne left Journals from their travels as officers with De Surville, 1769-1773. Both record the appearance of Maori dress, and M. Monneron remarks upon the Maori rope from Phormium he saw in use. (Hist. Rec. of N.Z., Vol. 2, pp. 267, 287, 317, 319.) Lieutenant Roux, of the ship "Le Mascarin" whose captain, Marion du Fresne, was killed by Maoris at the Bay of Islands, 13 June 1772, records the careful workmanship, and beautiful design of chiefs' cloaks. (Ibid. p. 369)

hands were required with greater freedom for the execution of their duties.

Since the rank of a man was shown by his clothing, there was the need for those of high rank to be as meticulous as any European gentlemen about their dress, its appearance and quality. In the process of time this consideration led to great advancement in the realm of manufacture, the native 'tailors' taking great pains over their work. From this class discrimination of dress there arose new fashions. Some cloaks were plain and unornamented (the parakiri), while others developed complicated patterns in the colour of the tags, pompoms, feathers, and flaxen rolls with which they were decorated. Some of the finest weaving was done in making the mats and cloaks of the 'upper class' Maoris, especially in taniko weaving. This art of weaving a coloured border pattern on a mat, cloak, or other garment was the only original development in Maori weaving, one which became very highly skilled, and one which because of these two factors needs some further explanation. The number of colours in the pattern (like the number of characters in Greek tragedy) was increased gradually. The pattern began with the use of black (dyed with a mud dye) and white (the natural colour of the Phormium fibre after bleaching). Later, however, it developed having added to it the red ochre hue so common in Maori patterns. Yellow threads were introduced by using fibre which was incompletely stripped, the mucilage of which gives the fibres such a tint. For such a multi-coloured taniko border

the wefts were made of cords comprising the threads of all the colours to be used in the pattern. As each colour in turn was to be used it was selected from the cord and woven over the warps, the remaining threads of the cord being carried along the reverse side of the cloth. It certainly was a most skilful and a very beautiful art. These developments, paralleling others in the use of feathers, coloured tags, and dogskin strips,(22) came about largely by the stress laid upon the connection between rank and dress.

Surrounding many special occupations, raw materials, and skilled crafts there lay religious or magical rites. Strangely enough, although when weaving there were rites to be observed, and ritual laws to be kept - flouting them could mean death - nevertheless, around the raw material Phormium tenax, there had been erected no religious barricades, or ceremonies, not even at the harvesting of the leaf; nor was Phormium used in religious performances with any special significance.(23) The importance of learning the art of weaving the Phormium fibre, however, was signified by the ritual attached to the learning. A pupil who was taught by a Tohunga was not to be interrupted during the lesson, and so on. For the weaving two vertical weaving sticks were driven into the ground, and the warps strung vertically from a cord between the sticks. At first these were plain, but later they were ornamented. With the

(22) G.J.Black, in an article on dogskin cloaks, refers to one consisting of 144 half-inch strips of differently coloured dogs' skins sewn together on the groundwork of Phormium, creating a prize native 'Joseph's cloak'. Journals of the Polynesian Society, Vol. 31, p. 59f.

(23) G. Bennett: Wanderings in New South Wales..., p. 74. Also commented on by A. Hamilton: Illustrations of Maori Art, Part IV, passim.

carving of the stick the Maoris associated religious significance, at least to the dextral or right-hand stick. To pass to the rear of this 'loom' was a religious crime from which death might result.(24)

The weaving was done by hand, without the aid of either loom or shuttle. Elsdon Best claims that Captain Cook wrongly recorded that the Maoris used a bodkin when weaving, and comments that such was used, not in the actual weaving, but rather only for disentangling any caught-up threads of the pattern. All Cook says, however, seems to be that there was a bodkin of bone attached to the end of the string whereby the gathering in of the upper garment was facilitated.(25) Certainly the bodkin was not used in the process of weaving which was dexterously done with the fingers - hence the name 'finger-weaving' which more truly describes the Maori art.(26) Their weaving was of a very high standard, especially in the making of ornamented cloaks: this was an art acquired only after much laborious practice and long experience, an art which is rapidly being lost to the Maori people today largely because the necessary work involved in learning it is not being done by young Maoris.

The loss of the true art of weaving, and of many other things characteristic of Maori culture, can be traced, at least in part, to the coming of the Pakeha with such a different culture which he was prepared to impose upon the natives without stopping to examine theirs. This

(24) A. Hamilton: op. cit.
(25) E. Best: The Maori, Vol. 2, Chap. 19. Cook's Journal, March, 1770, J. Hawkesworth: Account of Voyages..., Vol. 3, p. 453-454.
(26) For weaving with a shuttle, a loom in which there is some mechanical system of alternating threads is required: the Maoris had no such system. Therefore they had no loom, nor could they have used a shuttle.

is said to be due in part to the English philanthropist movement of the nineteenth century, a movement which considered enlightenment, it seems, only in terms of European civilisation. On the other hand, however, at least in the realm of weaving, the women engaged in that industry found that the Pakeha could offer good strong fibre (in the form of wick material which was supplied to the early settlers for making candles) which had not to be so laboriously prepared. Thus began the gradual introduction of the mixing of Phormium fibre and cotton and other materials in the manufacture of Maori garments.(27) Not only did the European immigration affect the production of Maori cloths by introducing 'foreign' matter into the constituent fibres, but also this 'intrusion' of the European civilisation upon the Maoris led to the Maoris giving up manufacturing clothes for themselves, and adopting the dress of Europeans. Both M. Monneron and M. L'Horne, in their Journals, give rather humorous descriptions of the chiefs who boarded their vessel throwing away their prized dogskin cloaks, or offering them to De Surville, and donning, with evident delight, the European dress of the French sailors or, even better, of the officers.(28) This strikes a prophetic note brought out later by the Rt. Rev. H. W. Williams, sometime Bishop of Waiapu (Hawke's Bay), when he stated:

"The red blanket became at once a fascinating article of

(27) P.H.Buck: The Coming of the Maori, Chap. 8, passim. This mixing of materials can be seen in some of the cloaks exhibited in the Maori section of the Otago Museum.

(28) Messieurs Monneron and L'Horne - Hist. Rec. of N.Z., Vol. 2, pp. 267f, 317f.

> trade to the Maori. This, cotton shirts (at 2/-), trousers (at 2/1d.), and suits of fustian and flushing are frequent entries in the early invoices of the Mission at Kerikeri. The adoption of European clothing was gradual, not devoid of its ludicrous side..." (29)

Those opposing the introduction of European clothing for the use of the natives have repeated often the disaster of the move as shown by the incidence of tuberculosis among Maoris, especially in earlier times, through natives remaining in wet European clothing which of course stuck to them in a sodden state. There is no doubt that this did happen - and still happens - because the Maori's native dress was loose, and generally water-proof, since almost the only garment of any size worn outside was the rain cloak.

With the settling of Europeans in New Zealand, the Maoris' relationship to Phormium tenax changed. Not only did they accept the clothing which the Pakeha offered, but they also cut their plantations of flax, and the swamp supplies for his commercial use. Very often they also dressed the leaf, bartering the fibre, dressed or partially dressed, with the traders for all manner of trinkets. Governor King was made to think that the Maoris held the Phormium quite cheaply among their possessions because they were prepared to barter for trinkets with Sir Joseph Banks on Cook's first voyage; but it must be remembered that to the Maoris at that time these trinkets, no matter how trivial and valueless to the European trader, were luxuries.(30) Later, however, the Maori

(29) Rt. Rev. H. W. Williams: "Reaction of the Maori to the Impact of Civilisation", from Journals of the Polynesian Society, Vol. 44, p. 216 ff.

(30) King's Journal, Hist. Rec. of N.Z., Vol. 22, p. 536. Passage containing King's opinion already quoted, p. 19, note (9).

showed his commercial capabilities when he realised that this fibre and leaf were worth much to the white men - so valuable that they would give the Maoris guns and other 'costly' articles (certainly ones of real worth to the European) for quantities of the New Zealand product.

Before proceeding to the consideration of these early visitors, traders, and settlers, and their relation to New Zealand, (31) at this point it may be helpful to saw something of the Maori varieties, selected by them through decades of experience with Phormium tenax, varieties which were influential in the early years of European acquaintance with Phormium. One of the greatest difficulties confronting anyone who cares to make a real study of the Maori varieties of Phormium tenax, their names, identification, qualities, uses, and so forth, is that of collating all the different names for similar or identical varieties. Different tribes had different names for the same variety of flax; and classification thus can become very complicated indeed. For example, in the Bay of Plenty area the best variety of flax is called Rongotaimui, (32) whereas in Taranaki, what appears by description and similarity of purpose to be the same variety, is known as Paritaniwha. (33)

Within the species Phormium tenax, or Harakeke as it was generally known to the Maoris, there were three divisions of varieties as given by Thomas Kelly who had done quite extensive research in Taranaki on this

(31) Next chapter - "Early Forecasts and Visitors, 1769-1817".
(32) E. Shortland: Traditions and Superstitions of the New Zealanders, p. 206.
(33) T. Kelly: Soil, Climate, and Capabilities of Taranaki, p. 11.

subject. These divisions were based on the methods of preparing the leaf for use, and on the uses to which the varieties were put. These considerations, of course, were really based on the botanical properties of the varieties. Furthermore, at least there was agreement about the names for the first two divisions, Tihore and Haro; for the third division (the common swamp flax) the proper name was Harakeke, which was also taken for the whole species, no doubt partly because the other varieties were selected and transplanted from the swamps. As with the description of the method of preparing the leaf and the extraction of the fibre, where Sir Peter Buck is the principal authority, here Thomas Kelly has given a good description of the three main divisions of Maoris' varieties as he found them:(34) "All varieties of flax of the first class (Tihore) must be planted..." in rows six feet apart with the same distance between plants. They needed, Kelly observed, a rich moist soil in flat land. Two years after planting they should yield leaf ready for cutting, after which it was contended that the leaf could be harvested annually. He remarked,"This flax, according to the native process of manufacture, only requires to be rent with the hand and nails without scraping, and is prepared with the greatest ease".(35) The second class, in which the commonest varieties of flax fall, he distinguished by the method of native manufacture - "the common species of flax required to be scraped with a shell and then to be steeped in water four

(34) Ibid.
(35) Compare the Takiri process described by Buck, p. 20-21 above.

days, afterwards taken out and beaten to clear it of refuse, and then dried again and scraped a second time". (36) Kelly dismissed consideration of the third class of flax with the comment that it was useless for European manufacture, and that most of the varieties in this class were used by the Maoris for plaiting mats and in the manufacture of rough garments only.

It is noteworthy that F. G. Moore, in his article, "The Importance of the Native Flax", (37) gives six varieties with but brief description of their identity by stating their soil requirements, and the uses and reputation of a few of them. Of all these only the name of the finest class coincides with those given by Kelly - Tihore.

The real importance of the Maori varieties, however, did not lie in any coincidence, or otherwise, of names, but in the use of these various classes of Phormium tenax for different purposes, and the relative value placed by the Maoris on the different varieties. These were the factors which influenced the observers who visited this country from Europe; these were the factors which gave the Pakeha some idea of the possibilities of utilising this indigenous product of New Zealand to their own advantage; these were the factors which were very important as the foundation upon which scientists could work when the Pakeha later came to study selected varieties. Such were the considerations which made the Maori treatment of Phormium tenax, and his whole attitude to it, of the

(36) Compare the Haro process described by Buck, p. 20 above. It will be noticed that there are variations in the methods described - the second scraping according to Kelly, and the beating, not to soften the fibre, as Buck says, but to rid the fibre of the glutinous mucilage.

(37) Article quoted by Hursthouse: Lecture on New Zealand.

utmost importance to the influence which Phormium tenax has had upon the history of New Zealand.

C H A P T E R III.

EARLY VISITORS AND FORECASTS, 1769-1817.

Throughout his travels, in the midst of the exacting task of charting the coastline of New Zealand, Captain James Cook, with his two able friends, Joseph Banks and Dr. Solander, both of whom were naturalists, never failed to remark upon the nature and appearance of the coastline, and the habits, dress, and characteristics, both physical and temperamental, of the inhabitants of the many bays and coves which he stopped to explore. Thanks to the trained eye and vivid quill of these men we have noted for us, from the very commencement of European contact with this country, the appearance, qualities, and potential value of the products of New Zealand. Among these, Phormium tenax figured prominently.

Reference has already been made to the descriptions of Maori dress given by Cook. Again, however, we have cause to notice some of his comments. Cook evaluated the 'hemp' he saw in New Zealand when he wrote his impressions of the country in "Some Account of New Zealand". He linked together the possibilities of using both the timber "fit for all purposes except Ships' Masts" and the "very broad-leafed grass, like flags of the Nature of Hemp, of which might be made the very best of Cordage and Canvas".(1) Throughout this early period when European visitors wrote of their contact with New Zealand, such claims as these made by Captain Cook, whose judgment was to be respected, became common, and

(1) Cook's Journal -- Captain Cook in New Zealand (ed. A.H. & A.W.Reed), p. 140. - Also p. 142ff.. Also p. 243, the report of Dr. Anderson the surgeon on Cook's third voyage. He gives a brief account of Phormium, but it is chiefly botanical.

will be reiterated in this and subsequent chapters.

With Cook sailed the eminent naturalist, Josph Banks, who was an honorary member of the ship's company, paying for himself. His comments, coming from 'one who knows', servedas a striking endorsement of Cook's affirmations. That two men, writing separate accounts as independent of each other as it is possible to be when both were collaborating on the one expedition, should give such unqualified praise for a new discovery was at least evidence that the object of their eulogies had potentialities worthy of further investigation. Banks' 'verdict' on the New Zealand flax plant was certainly unambiguous:

> "But of all the plants we have seen among these people (the Maoris), that which is the most excellent in its kind, and which really excels most if not all that are put to the same uses in other countries, is the plant which serves them (the Maoris) instead of hemp or flax... So useful a plant would doubtless be a great acquisition to England, especially as one might hope it would thrive there with little trouble..."(2)

Here was an intriguing suggestion, not only for adapting it to European needs, for which Banks believed it could be used, but also for transplanting and cultivating it in the Northern Hemisphere. Some two decades later this latter suggestion was taken up by the Frenchman, Labillardière, sailing with D'Entrecasteaux in the "Recherche" in search of La Pérouse. Labillardière gave as those who stimulated his curiosity Cook and Banks who, from the European point of view, discovered

(2) Sir J. Banks: Journal during Cook's First Voyage, 1768-1771, p. 229.

Phormium tenax.(3)

Unknown to the English voyagers, at the same time as they were exploring and charting the coasts of New Zealand their French counterpart in marine exploration, De Surville, was also in New Zealand waters in the last days of the year 1769. According to the journals of two of his officers, Messieurs Monneron and L'Horne, Cook must have preceded them around the northern tip of New Zealand by some few days. Both these officers, as has been mentioned above, noted the dress of the Maoris they encountered when they touched at this country of their voyage across the Southern Pacific; both recorded that they did not see any of the plant growing, but M. Monneron commented: "We saw in New Zealand, some ropes of excellent hemp".(4) During this visit, the French bartered articles of clothing, iron, and trinkets with the natives for food. It was evidenced here, as in places during Cook's voyages, and as was to be withessed later on, that the Maoris would exchange anything for iron. This desire of the Maoris for iron and metal articles, especially muskets and shot, was attributed by Labillardière to their warlike nature, and it was important later on in the course of trade when there began the exchange of their valuable dressed Phormium fibre for guns at the rate of one ton of fibre for one musket.

Two and a half years after the visit of De Surville, Marion du Fresne

(3) Memoire sur la force du lin de la N.Z. - There he described the New Zealand flax "annoncée pour la première fois par le célèbre capitaine Cook et son illustre compagnon de voyage, Sir Joseph Banks..."

(4) Hist. Rec. of N. Z., Vol. 2, p. 287. Both these French journals are found in this volume.

another Frenchman,(5) was around the northern shores of New Zealand. From his ship, "Le Mascarin", Lieutenant Roux left a journal in which he constantly mentioned the magnificence of the Maoris' dress, but he says no more of the plant, if he saw it, nor of the methods of manufacture, nor of any possibility of turning it to commercial enterprise. At the same time, however, an officer of the ship, "Marquis De Castries", left a journal in which he commented on the fibre of which the Maori cloaks were made: it appeared to be superior to the fibre made in the French colonies. (6) In Queen Charlotte Sound the Forsters drew and described the flax plant they saw, and recommended that it should be universally known: these observations were made on Cook's visit to New Zealand in 1773.

It may seem to some today that the importance of these early visitors' accounts and appraisals of Phormium tenax was over-estimated; but it was their cumulative effect which counted rather than any great merit advocated in any one of them. Constant mention of this natural product of New Zealand eventually carried weight; indeed it would have been much less effective had there been one treatise written, followed by complete silence. The New Zealand flax plant, and the uses the Maoris had for it, were constantly, if incompletely and spasmodically, referred to by those returning from distant voyages. It was not long

(5) Marion du Fresne spent some time in the Bay of Islands, was too trusting of the Maoris who became hostile, and was massacred with others of his party on 13 June, 1772.

(6) Ibid., pp. 369, 471 - at the same time Cook was preparing for his second voyage, sailing from Plymouth Sound in July 1772.

before the possibilities of using Phormium were being forwarded as reasons that the British Government ought to be interested in the most distant lands in the Southern Hemisphere.

On 23 August, 1783, a proposal for establishing a colony on the eastern coasts of the island-continent of Australia was made by James Maria Matra, who had sailed with Cook in the "Endeavour" on that first great voyage of discovery. From Matra there seems to be no word about New Zealand flax until he came to set out before the English people and Government a comprehensive scheme for settling what was called New South Wales.(7) Matra could see, as many men after him were to realise, that the possibilities for commerce between Australia and New Zealand were considerable. When Matra had had contacts with the Maoris during Cook's first voyage, he had found them, especially those in the northern island, very willing and ready to barter with Pakeha traders. Thus, he inferred, if a settlement were established in New South Wales, on the eastern coast of Australia, trading posts could be established in New Zealand to the great benefit of England. After drawing attention to the possibilities of supplying the English Navy with much stronger, high-quality cordage - where cables of Phormium could prove themselves superior to European hemp ropes (8) - and with canvas which he believed would be "superior in strength and beauty to any canvas of our own country", (9) Matra mentioned that the threads of Phormium tenax could be subdivided to make the finest of linen and silk-like cambric. He concluded, "after my true, though

(7) Ibid., Vol. I, p. 36.
(8) Ibid. - "a cable of the circumference of ten inches would be equal in strength to one of eighteen inches made of European hemp".
(9) Ibid.

imperfect, description of this plant I need not enlarge on it as a very singular acquisition, both to the arts of convenience and luxury". Such may be the language of one desiring to convince his readers, but such forecasts for the use of a little-known plant must have been very appealing to many. To the English Government, if not to the people, however, there were other considerations. England had been at war with the rebellious American colonists, and the Treaty of Versailles had heaped coals of humiliation on the bowed head of English imperialism. England was in dire need and in search of a place for the transportation of convicts, it is true, but she was not very interested at the moment in the claims or potentialities of an unknown plant and its fibre in some savage islands at the other end of the earth. There were some of the Loyalists from the American War of Independence also, living in squalid conditions in London; they had to be settled somewhere urgently. It was for this latter group of unfortunate people that Matra made his proposal.

Lord Sydney, Secretary of State for the Home Department in the new Pitt Government, was also very concerned for the acquisition of a suitable place for the convicts. There was some suggestion of a convict settlement in Africa where 'all life dies and all death lives'. Lord Sydney, however, was in favour of Matra's scheme for New South Wales, which had been advocated in 1779 by Sir Joseph Banks as a suitable

place for such a colony. Thus in 1786, after Admiral Sir George Young in 1785 had also advocated the eastern coast of Australia for a convict settlement, Lord Sydney put the proposition to the British Government, and included, in almost the same words as used by Matra, a paragraph pointing to the advantages of such a settlement for supplying the Mother country with a raw material "which would be of great consequence to us as a naval power". (10)

1787 saw the commissioning of Captain Phillip with the first party of convicts for transportation. Phillip was to be Governor of a colony extending along the eastern coast of Australia from Cape York to South Cape, and inland to the west to the 135th degree of longitude; and he was to be Governor over 'all the islands adjacent in the Pacific Ocean'.(11) Phillip's instructions also included Norfolk Island to which, in February 1788, he despatched Lieutenant Philip Gidley King to ensure the island's safety from foreign occupation. It is maintained, however, that King's instructions from Phillip included the investigation of the native flax of the island, mentioned by Cook, with a view to cultivating it and manufacturing from its fibre. "The detachment under him consisted of one subaltern officer and six marines, a midshipman and a surgeon, besides two men who understood the cultivation of flax, with nine men and six women convicts..." (12)

(10) Ibid., p. 54. - One of the great opponents of the Gambia colony proposed had been Edmund Burke; it seems that comparatively few members, however, were advocates of it. The humanitarian element was strong (and growing) in the House of Commons.
(11) C.H.B.E., Vol. 7, Pt. I, p. 61.
(12) J. O'Hara: History of New South Wales, p. 39.

From these instructions of Lieutenant-Governor King of Norfolk Island, and from his subsequent actions which we must consider, it appears that the schemes of James Matra and Lord Sydney, together with the recommendations of Cook, his companions and his successors, must have borne some fruit, in so far as investigation of the native flax, Phormium tenax, was encouraged officially with the establishing of colonies at the antipodes. From this point, however, a new problem arose. Interest had been kindled in the possible uses of Phormium, but Lieutenant-Governor King and his men, who were supposed to know something about dressing flax (European flax), soon found that this new and 'necessary' material resisted all their attempts to strip it of the epidermis and mucilage, and to lay bear the precious fibre. The whole process was so very different from anything known to the flax-dressers who accompanied King to Norfolk Island. But there was one consolation - the natives in New Zealand knew how to dress their native flax, and the plants there and on Norfolk Island were the same. It is not surprising therefore that one finds the following entry in King's Journal in November, 1791:

> "...That method I do not think we shall ever obtain, without the assistance of a Native of that Country (New Zealand); or some person being sent there to observe their Method; As the Master of the "William and Ann" intends to try for whales on the N.E. coast of New Zealand, I proposed to him to endeavour by fair means to obtain two of the Natives from about the Bay of Islands, and Mercury Bay..." (13)

(13) Hist. Rec. of N.Z., Vol. 2, p. 536. - Bunker, the Master of the ship, was offered £100 by King for delivering those Maoris, but he did not succeed in securing anyone - R. McNab: Murihiku, p. 38.

King had found that the flax on Norfolk Island needed no cultivation; it grew luxuriantly all over the island, even on the cliff faces where it appeared that nothing else would grow. It may be asked why King was so urgent about finding the method the Maoris employed for dressing the flax. The answer is to be found in British policy and in the Lieutenant-Governor's instructions.

England was not willing to face the financial commitments of her new settlements in the south. They were for her an evil necessity and a constant financial drain. The English Government, therefore, desired the colonies to be as self-supporting as possible in the 'essentials' of food and clothing. Complaints of expense have already in 1789 come to Governor Phillip's notice in despatches from William Grenville, who succeeded Lord Sydney. It is not surprising that King gave as his reason for desiring the tuition of some Maoris "the Necessity there appeared to me, of rendering this island as independent as possible, for every article of cloathing and food..." (14) With the failure of Bunker, the master of the "William and Ann", to procure two natives, King sent a strong request to the Colonial Office to command the securing of Maoris to teach the Norfolk Island settlers their method of flax dressing.

In the meantime two other visitors were about New Zealand shores. In the same month as King noted in his Journal that he needed native

(14) King's Journal, November 1791; - Hist. Rec. of N.Z., Vol. 2, p.536. King thought that the Maori method of dressing must be easy because of the way that Banks had been able to get some dressed fibre for a few trinkets.

flax-dressers, Captain George Vancouver, a companion of Cook, was making his fifth visit to New Zealand in the course of a voyage around the world. Vancouver, however, made but brief reference to Phormium on this occasion, noting that flax plants were gathered, along with antarctic birch and other plants, to be taken to England.(15) Nearly one and a half years later Labillardiere, with D'Entrecasteaux in the "Recherche" looking for La Pérouse, also gathered some flax plants by bartering iron articles with the Maoris in the extreme north of New Zealand.(16) Vancouver never said whether or not the plants arrived in England safely, but certainly, as a later account showed, Labillardiere succeeded in cultivating his plants in France and experimenting on them.(17)

Meanwhile, Lieutenant-Governor King's request had been received by the Rt. Hon. Henry Dundas who told the Lords of the Admiralty to send a ship to New Zealand to collect the natives requested by King.(18) Lieutenant Hanson, in charge of the store-ship "Daedalus", serving in the Pacific, was despatched to carry out the order.(19) Having successfully enticed two young Maoris on board, Hanson considered it indiscreet to

(15) G. Vancouver: Voyage...Round the World, 1790-1795, Vol. 1, p. 197. Vancouver's visit to New Zealand in 1791 was confined in the main to Dusky Bay where few natives were seen, and only a derelict village.
(16) Labillardière: Voyage in Search of La Pérouse, p.87 (translation).
(17) Labillardière: Memoire sur la force du lin de la N-Z.
(18) R. McNab: From Tasman to Marsden, p. 77 ff. Also note Hist. Rec. of N.Z., Vol. 1, p. 130. - King also made his request in a private letter to Under Secretary Nepean, 18 April, 1791, ibid., p. 126.
(19) Hanson's orders came from his senior officer, Captain Vancouver. - G.J.Black: "Maori Visitors to Norfolk Island, 1793", Journals of the Polynesian Society, Vol. 30, p. 121 ff. Also, J. O'Hara: History of New South Wales, p. 169; J. L. Nicholas: Voyage to New Zealand, Vol. 2, p. 353 ff. (an appendix from Collins: History of New South Wales).

enquire whether or not they knew anything of flax-dressing, but ordered the vessel to put about, and imprisoned the young men. They were landed in Norfolk Island in May 1793. At first they were sullen, refusing to impart such knowledge as they possessed, but on being assured of their safe return to New Zealand when the dressers on the island had mastered the art the natives were to teach them, they proved willing to teach all they knew - which was very little. Both were twenty-four, one was a warrior of high class, related to the chief, while the other was the son of the tribal priest. Neither had much knowledge of the methods of dressing flax as this was done by women of lower class than themselves. Nevertheless they were able to give King and his flax-dressers some valuable guidance. After six months of 'exile' from their own people the two Maoris, Huru and Tuki by name, were returned by King to New Zealand, in November 1793. It seems that their impressions of the Pakeha were good and they had quite enjoyed their stay in Norfolk Island. They were not landed with their own tribe, but with a neighbouring friendly tribe, assuring King that they would be in safe hands with the friendly chief.(20)

(20) King's Journal, Hist. Rec. of N.S.W., Vol. 1, Pt. 1, p. 709; J. O'Hara: op. cit., p. 169; P.G.King: "Condition of Norfolk Island", Hist. Rec. of N.Z., Vol. 1, p. 215ff. On this visit to New Zealand King took with him his secretary, W.N.Chapman, and the assistant-surgeon whom Governor Phillip had provided for the Norfolk Island settlement. Both these men, on their return, wrote private letters to England, in both cases to relatives. From these there has come a slight confusion over the return of the two natives, Huru and Tuki, to New Zealand. Both the letters of King and Chapman concur as to the month when these young Maoris were returned, November 1793. (King, Hist. Rec. of N.S.W., Vol. 1, p. 709; and Chapman's letter, Journals of the Polynesian Society, Vol. 7, p.42) The assistant surgeon, T. Jamieson, however, says they embarked from Norfolk Island on 8 March, 1793, and the natives were disembarked on 13 March of the same year. King's writing shows that the date of the month (8th) is correct, but gives the month as November. In view of the fact that Jamieson's letter was written on 19 November it seems likely that he mistakenly wrote 'March' for 'November'.
(continued)

The conclusions of both Lieutenant-Governor King, and Thomas Jamieson, the surgeon stationed on Norfolk Island, were the same respecting the need for developing some sort of machine for dressing the flax. The native method was too "tedious". Both also agreed that there existed in the manufacture of products from Phormium fibre great possibilities. Thomas Jamieson wrote:

> "All that is now wanting is a machine that will dress it (Phormium tenax) in a more expeditious manner, which might easily be invented by an artist, the New Zealand method being rather tedious, and requiring many hands".(21)

Philip Gidley King agreed:

> "This flax needs no cultivation, as it grows sufficiently abundantly upon all the cliffs on the island (where nothing else will grow) to give constant employment for five hundred people; and should it be thought an object, of any quantity of canvas, rope, or linen might be made here... If a machine could be so constructed as to separate the vegetable covering from the flaxen filaments, any quantity of this useful article might be prepared with great expedition".(22)

Following his visit to New Zealand the Lieutenant-Governor of Norfolk Island, who had gathered some Maori articles, reported to the Rt. Hon. Henry Dundas by the captain of the "Britannia" on his visit to New Zealand to return the 'borrowed' Maoris, and sent with the captain for the perusal of the Imperial authorities, a box containing a Maori cloak and some Maori fishing lines.(23) Throughout the documents of Philip Gidley King during this period one cannot help feeling that there

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(20) (continued) The natives were landed in Norfolk Island only as recently as May, 1793, by Lieutenant Hanson of the "Daedalus"! (Jamieson's letter, Hist. Rec. of N.Z., Vol. 1, p. 182)

(21) Ibid.

(22) "Condition of Norfolk Island", Hist. Rec. of N.Z., Vol. 1, p. 516ff In a week eighteen men and women on the island prepared sixteen yards of No. 7 gauge canvas.

(23) Hist. Rec. of N.Z., Vol. 1, p. 168. The report was dated from Norfolk Island, 19 November, 1793.

is a constant belief in the potentialities of this flax plant found in New Zealand and Norfolk Island. Guided by this opinion King did not hesitate to send to England such articles of native manufacture as might convince those responsible of the value of possessing these islands in the South Seas. England was again at war, with revolutionary France (declared in January 1793), and her navy naturally had many 'calls' upon its strength. P. G. King, himself a naval officer, no doubt could see the tremendous advantage of having under British sovereignty a source of supply for naval stores. To his mind New Zealand and Norfolk Island offered such advantages.

Lieutenant-Governor King's recommendations regarding Phormium tenax must have inspired some of the authorities in England with hope. In 1794 Captain John Hunter, who had accompanied Governor Phillip with the first contingent to Australia in 1787 as master of the "Sirius", was appointed to the position of Governor of New South Wales. His instructions, dated at St. James's Palace, 23 June 1794, included a very interesting clause:

> "6. And whereas it has been humbly represented unto us that advantages may be derived from the flax-plant, which is found in these islands, not far distant from the intended settlement, not only as a means of acquiring clothing for the convicts and other persons who are and may become settlers, but from its superior excellence for a variety of maritime purposes, and as it may ultimately become an article of export: It is therefore our will and pleasure that you do particularly attend to its cultivation, and that you do

> send home, by every opportunity which may offer, samples of that article, in order that a judgment may be formed whether it may not be necessary to instruct you further upon this subject". (24)

This clause in Hunter's instructions shows something of the growing interest of the English Government towards the possibilities of Phormium. In later years(25) a controversy was to arise over the varying estimates of the value of this flax; and the full difficulties of manufacturing the fibre products from the green leaf were to be realised.

In the meantime, in 1796 there appeared in the pages of the Annales du Muséum d'Histoire Naturelle an article by Labillardière, which T. M. Hocken rightly described as "the first scientific account of the New Zealand flax fibre". (26) In this account Labillardière described how he conducted a number of experiments comparing the merits of threads of different fibres.(27) Reports were given on the flexibility, stretch, etc., of Phormium - and the results were very similar to those reported from dockyards in England and from vessels three decades later.(28)

One can well imagine the effect that the favourable reports of

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(24) Hist. Rec. of N.Z., Vol. 1, p. 195
(25) Chiefly the two decades, 1820-1840, see Chapter IV.
(26) T.M.Hocken: Bibliography of New Zealand Literature, p. 27.
(27) "... le fibres du chanvre n'ont été rompues que par un poids de 400, 5917 grammes; celle du lin se la Nouvelle-Zélande, par 590, 5034 grammes; celles de L'aloès-pitte, par 176, 2349 grammes; le lin, 295, 8228 grammes, et le soie par 855, 9978 grammes". - Labillardière: "Memoire sur la force du lin de la N-Z." in Annales du Muséum d'Histoire Naturelle (1796), p. 474-484.
(28) See Chapter IV below.

Labillardiere would have upon any interested in naval supplies and stores. Not only to the English interests, but also to those in France interested deeply in the South Pacific, these reports which placed Phormium tenax in such a favourable light must have made a strong appeal. We have seen how British interest had already been quickened by successive reports from visitors to New Zealand, and from the Lieutenant-Governor of Norfolk Island. One may be certain that the results of Labillardiere's experiments would not be lost on interested persons across the Channel.

In 1800, the Lieutenant-Governor of Norfolk Island, Philip Gidley King, was promoted to succeed John Hunter as Governor of New South Wales. King was not thrilled with his mission to New South Wales, which he saw as an unruly colony into which he had to instil order.(29) An Acting Lieutenant-Governor had to be appointed to Norfolk Island; the post went to Major Foveaux. His instructions seem to echo those of Governor Hunter; and indeed they go further to cover an attempt to establish plantations of European flax and cotton if they were found to be preferable to the native flax. Nothing was to be spared in these experiments, and the cultivation of Phormium. Again, King's chief concern seems to have been for providing "such cloth as can be worn by the convicts".(30) No doubt King was constantly made to remember that

(29) Hist. Rec. of N.S.W., Vol. 4, p. 892.
(30) Ibid., p. 99-100.

the Home Government, in the midst of war, was not favourably disposed to spending a great deal on the outposts of the Pacific, even if they did offer future resources.

After an armed truce, and the stalling of the French fleet heading for the West Indies to destroy British interests there, Britain seemed more secure from the Napoleonic army marshalled at Boulogne; but the Third Coalition in the year 1805, the year of its inception, appeared to be altogether defenceless before the French forces. Again fears for the safety of England's interests abroad were held; and the French gave evidence of particular interest in the southern seas. Therefore, in that year, Governor King first made the suggestion that a British naval patrol ought to be detailed to police the islands in which Britain had interests. No doubt, at the time a patrol could not be spared - for one was not sent - but a ship from the East Indies squadron was stationed off the coast of New South Wales for its protection. Under the Governor's orders occasional patrols of the major islands were made.(31) Governor King could see the importance of the link across the Tasman Sea with New Zealand, around whose shores whalers and sealers were operating with their bases in Australia. Among them also there appeared a growing interest (as yet very faint) in the articles of Phormium fibre made by the Maoris. In the Sydney Gazette for 22 June, 1806, there appeared an article on the dexterity

(31) J.M.Ward: British Policy in the South Pacific, 1786-1893, p. 58.

and patience with which the New Zealanders dressed the flax, mentioning the superior quality of the fishing lines made therefrom.(32) Governor King could see the importance of keeping these lines of communication and trade open and unmolested by foreign intervention.

So convinced was King of the work of Phormium tenax for naval purposes, that in an article he wrote in December, 1807, after relinquishing his post in Australia, he advocated wider cultivation of the New Zealand flax-plant in New South Wales, pointing out that only as late as 1804 had it been tried with success. He drew attention to some sails and an awning (made from Phormium) which were used on the ship "Buffalo" from New South Wales to England without deterioration - it "can now be produced as a sample of its goodness and strength", he wrote.(33) Following this declaration, it was not long before there were suggested schemes for trading solely in Phormium tenax. Many men were beginning to realise what profit might be earned from such commercial enterprise.

In 1809 a syndicate of three prominent merchants in New South Wales was formed seeking Governor Macquarie's support for setting up a company to establish a station in the North Island of New Zealand for the purpose of gathering flax which they proposed to dress and manufacture into cordage and canvas. The whole enterprise was to be carried

(32) Quoted by J. O'Hara: History of New South Wales, p. 276.
(33) An article by Ex-Governor King on Australian timbers, etc., Hist. Rec. of N.Z., Vol. 1, p. 287.

out at their own expense. These three merchants, Messrs. Simeon Lord, Francis Williams, and Andrew Thompson, planned to supply colonial demands for cordage and canvas, and hoped, later, to extend their trade to provide the British Navy with these stores, should the whole scheme find favour at Home. In the event of their supplying the navy, they requested a monopoly on that 'market' for fourteen years. Governor Macquarie was in sympathy with their scheme and represented their cause to Viscount Castlereagh in one of his despatches. Macquarie visualised ultimate success, and great national benefit; therefore he supported the syndicate.(34)

The scheme went forward with William Leith and George Bruce (an ex-convict and son-in-law to the Bay of Islands chief, Te Puhi) as the leaders of the New Zealand station. Unfortunately this £2000 enterprise foundered. The Maoris in the area were greatly weakened by constant tribal warfare; Te Puhi, the friend of the company, was killed. Leith had to admit, "With all my exertions I have made, and after being every day on shore at all the native towns in the bay, I am much concerned to say that I could not obtain more than four pounds of flax. Not so much as a single mat is to be had."(35) Leith and Bruce could never agree and when the company failed Leith made serious accusations against Bruce, suspecting him of duplicitous dealings and of seeking to destroy the

(34) R. McNab: Murihiku, p. 112; From Tasman to Marsden, p. 138. Macquarie's despatch, from Sydney, 12 March, 1810, Hist. Rec. of N.S.W., Vol. 7, p. 312-313.

(35) Letter from Leith to Lord, Williams, and Thompson, dated at Bay of Islands, 15 April, 1810, Hist. Rec. of N.Z., Vol. 1, p. 304. Leith was sending a box of samples of the flax and thread for the syndicate, by courtesy of Colonel Foveaux, to London.

company, both its property and members. Leith, however, was not the epitome of leadership; many of the company men were dissatisfied; and his allegations against Bruce seem unfounded. But whatever the combination of causes, the first flax trading company set up in New South Wales to work in New Zealand had failed.

At the same time as the scheme of the Sydney syndicate was being tried, there was a very different sort of body interested in New Zealand, the Church Missionary Society. In the annual report of the Executive committee of the Society for 1808 there appeared a recommendation from the Society's chaplain at Port Jackson for the establishing of a mission to New Zealand. This recommendation of the Rev. Samuel Marsden (he was the chaplain) was based on his contact with the Maoris who periodically visited New South Wales on board whaling or other vessels. He had found them to be a noble people, intelligent, and willing to learn. He concluded that a mission which would shed the light of both the Gospel and western civilisation could do much for the New Zealanders (as he called the Maoris) and show them the better side of the white man's way of life. He was quite sure (and correct) that many of the contacts with the Maoris made by various types of Europeans were harmful for the natives. Therefore, he commended for the Society's deliberation a scheme for the evangelising and civilising of the Maoris.(36)

(36) Proceedings of the Church Missionary Society, Vol. 2, p. 337, 361 f.

In the report of the following year reference was made to the appointment, along with another artisan, of John King, a competent flax-dresser: a scheme, along the lines proposed by Marsden, was under way.(37) The report of 1810 contained the address of the Society to the carpenter, Hall, and the flax-dresser, King, on their departure for Port Jackson, the first stage of the journey to their mission-field in New Zealand. King was to encourage the Maoris to make twine and cordage of use to Europeans, as well as to teach them the truths of Christianity.(38)

Naturally, Samuel Marsden was intensely interested in the plans of the syndicate of Sydney merchants already detailed. He could see their trading settlement as a good base for his mission to New Zealand. Consequently, he was disappointed when their start was delayed due to the news of the massacre of the crew of the "Boyd"; and he was very sorry when the syndicate's work foundered in 1810. Nevertheless, Marsden had been in close contact with a young Maori chief in New South Wales.(39) This young man had become enthusiastic over the Pakeha ways of agriculture, and was determined, upon his return to his own people, to implement them, and to set up a Sunday school. Marsden recalled how the chief had desired that King should go from Parramatta, Marsden's base in Australia, to New Zealand to help the Maoris to improve their fibre production. Marsden became very interested in the possibilities

(37) Ibid., p. 485.
(38) Ibid., Vol. 3, p. 107f.
(39) Such contacts were important; Rev. R. Taylor in Te Ika a Maui says they were the origin of the mission to New Zealand. (p. 194 ff.

of using the New Zealand flax to English advantage - which, no doubt, would have helped the Church Missionary Society too! He wrote:

> "I have enclosed a few threads of the New Zealand flax which was sent to me a few days ago. Ship-loads of this flax may be got at New Zealand should it be valuable - will you have the goodness to request some Gentleman of the Society to ascertain its value. I have sent it as I received it - and might also find employment for the natives to collect it..." (40)

For long, however, nothing seemed to happen. Marsden had to be content with setting up a seminary at Parramatta to educate those natives, chiefly young men, who landed in Australia, and try to evangelise them. In the meantime, secular commercial interests were at work again.

Already we have seen the fate of a company of flax-gatherers in the North Island. Now there followed, in the second decade of the nineteenth century, a company in the extreme south, about Foveaux Strait. A complicated series of negotiations, proposals, and contracts preceded the formation of the company in 1814. Again the names of Lord and Williams of the former syndicate were involved in the various phases before, and during, the formation of the New South Wales New Zealand Company for trading in flax.(41)

In a report, Williams summarised the attempts that had been made

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(40) Letter from Parramatta, 16 August 1813, to Rev. Josiah Pratt, Secretary of the Society.

(41) The Williams in the new negotiations (1813-1817) goes by the name of Robert, not Francis Williams, and yet, from the various primary and secondary accounts which are available, they seem to be the same person: if they were not, they must have been related - at least in interest. Later Marsden referred to a convict, Robert Williams, as an excellent flax-dresser. (See below, footnotes 52 and 61.)

to utilise Phormium tenax,[42] claiming that, while the experts in England and in the colonies had given up this plant and its fibre as useless, he had managed to find a new method of dressing it.[43] At first he could not persuade Governor Macquarie of his success; nor did he receive any active encouragement from Lord, or from Messrs. Hook, Birnie, and others whom he contacted. Finally, however, he managed to sign a contract with Hook, Birnie, and Gordon, to look for flax in New Zealand, obtain a good supply, and put into effect his new method of preparing the flax. Again Birnie rejected Williams' suggested method and substituted a scheme of his own, putting Williams at a severe disadvantage in the new agreement: Williams would receive only one twentieth of the profits. The new contract was signed on 25 March 1813. There followed the visit of Williams in the "Perseverance" with Gordon, and the Secretary of the new association, Jones. This last gentleman was against the whole expedition, was concerned only with his own comfort (according to Williams) and saw little of the flax when the party discovered considerable stretches of it about Port Macquarie. The Captain of the "Perseverance", Murray, also gave a report which, for the basic facts, tallied with Williams' own very well.[44] Captain Murray did not mention the friction of which Williams made constant mention, between Jones and Williams. Unhappily, for the latter

(42) Dated, Castlereagh St., Sydney, September 1813. - Hist. Rec. of N.Z., Vol. 1, p. 457 ff.; R. McNab: Murihiku, p. 131-144.
(43) Williams had a rope works in Castlereagh Street, Sydney, and so was not unacquainted with Phormium tenax - ibid., p. 130.
(44) Captain Murray's account - ibid, p. 145 f.

the reports of Jones, Gordon, and Murray carried more weight with Birnie and Hook than did his own. As a consequence this venture was a fiasco. There were many set-backs; money was scarce; the project would require more capital than was available. With the friendly natives about Port Macquarie, there was a competition to see whether Williams' small machine (set up on the beach) could 'out-strip' a number of native women flax-dressers. The Maoris were greatly amused at the pakeha machine, which was quite deficient. This must have been a great blow to Williams, who recorded that the ship headed for Port Jackson too soon, at Jones' suggestion. The voyage had been altogether unsatisfactory, even though some good 'deposits' of flax had been found. Finally, Williams fell out with Birnie when he sent to England inferior samples of partially dressed fibre against Williams' wish.

Williams turned to Simeon Lord: they negotiated for setting up a permanent settlement and factory in New Zealand with sixteen men. Lord was to send these men to New Zealand where they would be taught the ways of dressing the flax for its fibre which would be worked in New South Wales by Williams who undertook to set up a factory there on his return from establishing the settlement in the south of New Zealand. Lord was to provide the ship for the project; and was responsible for the protection and provisioning of Williams and his party in New Zealand.(45)

(45) Hist. Rec. of N.Z., Vol. 1, p. 470 ff. - McNab, compiling these records, explains that the remainder of the documents relating to the negotiations of Williams and Lord are lost.

Unfortunately the last part of the document containing these proposals of Williams is lost, and the reason for the contract being left in abeyance is not known. The possible answer is to be found in a much wider scheme which culminated in an application to the Governor in 1814 for the licensing of a stock company. With this company in 1814 Robert Williams signed an agreement for the provision of a vessel, men, and equipment sufficient for six months' occupation of New Zealand, to establish a factory at Port William (Stewart Island) or thereabouts, for the manufacture of hemp. In the company, Williams was to have twelve £50 shares to be paid from the profits of the company. The latter, for its part, was to provide for Williams' family while he was in New Zealand.(46) The application to His Excellency, Governor Macquarie, for licensing the company, to be named the New South Wales New Zealand Company, was dated at Sydney, 3 October 1814:

> "...by advertising for all persons who were inclined to come forward and incorporate themselves into a stock company, dividing it into shares of £50 (two hundred of them) ...; and having obtained Your Excellency's permission to advertise and convene a meeting for that purpose, and with a view to establish such settlements and factories at New Zealand as might be thought advisable, or likely to answer the intended purpose of procuring and preparing the New Zealand hemp and flax plants suitable for this, or any other markets, together with timber, or any other articles the natural products of that island... constituted or incorporated by a certain charter or license from Your Excellency as Governor in Chief of this colony..." (47)

(46) Ibid., p. 473 ff.
(47) Ibid., p. 324.

This was signed by five men, S. Lord, G. Blaxcell, R. Brooks, W. H. Hovell, and E. S. Hall. In view of two things, the negotiations of Lord and Williams, and the contract between the new company and Williams, it is rather striking that Robert Williams' name is neither mentioned in the text nor appended as a signature. Yet, preceding this paragraph in the memorandum to the Governor, there was a summary of the attempts made at establishing settlements for the same purposes as the company outlined as its objective - a summary such as has already been discussed, written by Williams after his negotiations with Birnie and others.

The New South Wales New Zealand Company failed, as previous similar attempts had failed. Try as they would, it seemed impossible to obtain men willing to 'bury' themselves (as so many considered it) on the bleak southern shores of New Zealand. One of the major reasons for the failure of the 1810 attempt in the north of New Zealand had been the lack of labour: now the same consideration wrecked the 1814 company. It must have seemed to those most interested in settling portions of New Zealand at this early period for the purposes of trade, that as yet no one was interested in New Zealand and its potentialities. It also must have looked as if New Zealand flax was not as important as they had thought: no one was prepared to try it out, to see whether the claims of men like Williams were true.

A consideration of those who advocated trading for flax with the Maoris shows, however, that there were, in fact, many who, while not prepared to settle in New Zealand to carry on the flax trade, wished to send vessels to gather from the Maoris as much leaf and fibre as they could produce and would barter. This sort of trading grew from small beginnings in the second decade of the nineteenth century to large proportions in the early 'thirties. Many considered that there was no need for the expense of establishing a factory in New Zealand, or even a depot where supplies might be stored awaiting the arrival of a ship from Australia. The Maoris seemed willing enough to store up their flax and trade it with the first ship to come their way.

Rev. Samuel Marsden, in his account of his visit to New Zealand (1814-1815) in the Church Missionary Society's recently purchased vessel, the "Active",(48) tells how, north of the Bay of Islands, he arranged with some Maoris to buy some dressed fibre from them on his return journey, after visiting the Bay of Islands. Three hundredweight of fibre was bought there on the homeward journey, and Marsden took the chief's son back to Port Jackson with him at the chief's request.(49) McNab records that the influence of Marsden and his two missionary companions, Messrs. Kendall and King, upon the trading during this voyage was both considerable and beneficial, due no doubt to the good name

(48) Letter to C.M.S., 22 September 1814 - Proc. C.M.S., Vol. 4, 1815.
(49) Hist. Rec. of N.Z., Vol. 1, pp. 352, 395.

Marsden had among the northern Maoris for his work with some of them in New South Wales. On 25 February 1815, they set sail for Australia. "The value of the cargo on board the 'Active' was thus calculated:

"4848 ft. timber @ 2/6d.	£606. 0. 0
Less duty, 1/- per foot	242. 0. 0
	364. 0. 0
"1344 lbs. flax @ 1/-	67. 4. 0
"Fish and pork	20. 0. 0
	£451. 4. 0" (50)

There is no mention in this table, given by McNab, of the potatoes which Marsden mentioned getting.(51)

Marsden's interest in the possible value of Phormium tenax continued for a number of years, during which he sent home to the Secretary of the Church Missionary Society, Rev. Josiah Pratt, a number of samples of the leaf and fibre, asking the Society to have the value of same estimated. He also asked for the Society's help in gaining the mitigation of the sentence of a man who was adept at handling the flax, in order that he might be able to assist Marsden and his fellow missionaries.(52) The Society was very willing to assist in every way possible. Their report, however, stated that the samples Marsden had sent were too small for thorough testing, and the limited tests that were applied showed the fibre to be not an unqualified success.(53)

(50) R. McNab: From Tasman to Marsden, p. 186.
(51) Hist. Rec. of N.Z., Vol. 1, p. 395.
(52) Letter, Sydney, 30 June 1815. - Strangely enough the name of the convict was Robert Williams. Was this the man who was connected with the New South Wales New Zealand Company, and petitioned Governor Macquarie in 1817 (Hist. Rec. of N.Z., Vol. 1, p. 409)? (See footnotes 42 and 61.)
(53) Proceedings of the Church Missionary Society, Vol. 5, p. 468.

Perseverance was one of the marks of Marsden and his confederates. A later report of the Society noted that the flax-dresser, King, was teaching Maori boys how to make twine, with considerable success.(54) Marsden never ceased to consider how the Maoris might be kept peacefully occupied, and brought closer to western civilisation: "...flax in New Zealand is an annual plant and grows without cultivation, more or less in every part I have visited, and would afford constant employment to the women and children, should it be found of any value to Civil Society..." (55)

Occasional bundles of flax were taken from New Zealand to Sydney, or even to England, and were tested; but progress in using the fibre seemed imperceptible. Advances were made, however, slow though they appeared. The Australian colony was not yet so flourishing within its own bounds as to be able to foster expensive external enterprises such as any extensive experiments with Phormium would involve. The Australian settlers had every cause, in the middle 'teens of the century, to look westward across the mountains rather than eastward across twelve hundred miles of stormy sea.(56) It was not surprising, therefore, that it was not until early 1817 that the next detailed proposal for establishing a flax-trading factory and settlement in New Zealand was presented to Governor Macquarie for his sympathetic consideration.

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(54) Ibid., Vol. 6, 1818.
(55) Letter, Parramatta, 13 June 1815.
(56) 1813 saw the first crossing of the Blue Mountains; in 1815 the road through the pass to Bathurst was opened and the way to development was clear; 1816, the land of the 'interior' was available for settlement, and by 1818 the first settlers were established. No wonder there was little attention paid to the east.

This final proposal to be discussed here - a proposal which initiated a long series of tests and experiments with Phormium tenax, 1818-1838 - was proffered by Robert Williams in a 'memorial' to Governor Macquarie.(57) After commending himself to the Governor's attention, as a rope-maker with considerable experience with Phormium tenax, and as the inventor of the only successful means of dressing the leaf to extract the fibre (illustrated by the samples which he presented to the Governor), Williams pointed to the need for publicising "this valuable plant (which) rested in oblivion, tho' its productions were high demand (sic) and an object of importance to the British Government". Despite the high quality of the fibre of Phormium, many English experts, failing to dress the leaf, had declared this little-known plant to be worthless: at this Williams expressed no surprise, saying that he understood this hasty verdict because of the difficulty he had experienced in dressing Phormium, and introducing his new system. "...but he trusts the production will prove its value and vie with English manufacture. And memorialist states further his ability to perform every process of manufacturing with more speed than it is performed on such manufacture in England".

> "... persons well-informed in that business (the European flax trade) will be surprised to hear that this hemp may be cut from the plant in the morning and manufactured into cordage the same day, and that the average labour of ten men and five boys will produce one ton of hemp per day in equal preparation to hemp imported from Russia." (58)

(57) Hist. Rec. of N.Z., Vol. 1, p. 410-413 - dated 1 April 1817.
(58) Ibid.

As later developments have shown, Williams was exaggerating the speed and ease of the process of dressing Phormium. The error, however, was not so great, and the hyperbole was justifiable when it is remembered that those European experts referred to could think of the process of flax dressing only in terms of months of dam-rotting, and retting. From Williams' standpoint the contrast between the two methods could not be over-estimated.

Williams stressed the possibilities of cultivating the flax so that "upon a moderate calculation in a few years every yard of land in New Zealand will produce six pounds of hemp annually. And this may be performed by the natives, if instructed and encouraged, which may be accomplished by very moderate means". The latter part of this consideration, that of the cost, was carefully elaborated in the 'memorial'. Williams saw in the project an important and undisputable source for British naval stores - so greatly needed at the time, when war had jeopardised other supplies to England - and a lucrative article of commerce for the young Australian colony of New South Wales. Not only would the income be good, but Williams predicted that the capital involved would be small by comparison. Expensive machinery was not required; the machine he designed was made chiefly of wood which could be obtained "by nature on the spot". Water courses were to be the source of power. It was claimed that five carpenters and one blacksmith, in three months, could build machinery to employ a thousand Maoris, who,

at the end of a further month, would be trained sufficiently "to furnish immense quantities of hemp to such vessels as may be appointed to call for it".

Finally,

> "Memorialist humbly submits to Your Excellency's consideration, his exertions to introduce the New Zealand hemp were at a time when that article was greatly in demand in the Mother Country, the original supplies being nearly cut off by the effects of war, and encouragement held out to most of the British Dominions".(59)

The emphasis by Williams on the imperial advantage of adopting his proposal was a good one for the time. England was interested in colonies and trading posts only as they could benefit her in wealth and strength. Therefore Williams' line of attack was diplomatic, and more certain of receiving serious consideration than it would have been if he had concentrated on the colonial advantages only.

Governor Macquarie received Robert Williams' memorial very sympathetically, and immediately sent off a despatch to Earl Bathurst, Colonial Secretary, enclosing the outline of the scheme given by Williams.(60) Macquarie, knowing of Williams' former exploits with flax trading and manufacturing schemes, called him a "very ingenious man", and one whose character Macquarie could recommend.(61) While commending the memorial to Lord Bathurst's "perusal and favourable

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(59) Ibid. - Canada especially was looked to for naval supplies for England.

(60) Hist. Rec. of N.Z., Vol. 1, p. 409.

(61) This would seem to indicate that the Robert Williams concerned with this, and former schemes was not the person referred to by Marsden as a convict. (Refer back to footnotes 41 and 52.)

consideration", Governor Macquarie showed he knew full well the implications of an official endorsement of the plan outlined. Macquarie was so certain that Williams could do what he claimed in his proposals that he was willing to give the official encouragement - which implied spending Imperial Government funds - which would ensure security and success to such a factory as Williams wished to build in New Zealand.

> "...I entertain not the least doubt of the statement made by him in his memorial being perfectly correct, and that he is competent - if he had the required assistance - to fulfil all the promises held out by him in his memorial; but to enable him to do so, and to carry this branch of manufacture on with a certain prospect of success, it would be necessary to afford him sufficient protection from the eventual hostility of the natives of New Zealand, by the establishment of a British settlement there, with a small detachment of troops." (62)

Thus, by 1817, Phormium tenax had been brought, by continual reference, before the 'public eye'. It was now to be examined officially, carefully and critically to test its estimated value. Visitors to New Zealand had observed and described it. Traders had bartered with the Maoris for it. A few enterprising men had already expended much time, energy and capital upon it. 1818 was to begin a new period in the history of the influence of Phormium tenax upon the attitude of Englishmen to New Zealand: simultaneously there were raised hopes and fears, appraisals and criticisms in the light of technical, empirical examination.

(62) Ibid.

CHAPTER IV.

TESTS, TRIALS AND EXPERIMENTS, 1818-1838.

The year 1818 opened a new phase in the investigations made into the nature and commercial potentialities of Phormium tenax; from this year forward those who proposed grand schemes for using this plant and its products for commercial purposes were faced with exhaustive experiments, adverse criticisms from men who were experts in the field of naval stores, and a consequent hesitancy in official circles. Governor Macquarie had praised the scheme of Robert Williams with enthusiastic tones, but the reply of the Navy Board, after tests had been carried out at the Chatham Rope Yard, was by no means enthusiastic. This most adverse report from the Rope Yard sounded the first of many subsequent harsh judgements passed upon the New Zealand flax. Two decades later, similar reports were handed to the House of Lords, but also on that occasion there were keen and skilled advocates for the use of ropes and canvas manufactured from Phormium. The succeeding and contradictory reports, and the declaratory statements of the years 1818-1838, both for and against Phormium, form the complicated network which is the subject of this chapter.

In June, 1818, T. M. Haite and W. Penwick, the responsible officers at the Chatham Rope Yard in England, recorded the results of their experiments with the samples of Phormium tenax which had accompanied Robert Williams' memorial on this native plant of New Zealand. Because the samples of Phormium were small their tests were limited, but their conclusion was still depressing: "It will therefore appear that the lines and twine from the New Zealand hemp bore little more than two thirds the

weight of those made from Riga and Chili hemp." (1) Here was the first official test and its result - nothing very inspiring. The remarks and the table of results of these officers in England were a far cry from the enthusiastic eulogies on Phormium tenax sounded by so many of the early advocates like James Matra.

One report, however, could not stem the flow of Phormium from New Zealand across the Tasman Sea to New South Wales. Writing in 1832, R. W. Hay remarked upon the quantity and value of the exports of Phormium leaf and fibre from New South Wales in 1818 - sixty tons worth £2,600 were sent to England from Sydney.(2) In that same year affairs in Australia were very agitated, with Governor Macquarie at loggerheads with influential sections of the Australian colonists. The Colonial Office, in 1819, ordered John Thomas Bigge to examine thoroughly every aspect of the life of the Australian colony, to report back to the Colonial Office, and to make constructive suggestions for future changes which might lead to tranquility there.(3) At first it would seem difficult to imagine how he might conceive of the trade in Phormium tenax as of importance to that young colony; but when one considered the figures given by Hay, it was evident that that trade was becoming important. Therefore Bigge, with his conscientious thoroughness, set about enquiring into the possibilities of using Phormium in the British Navy.

(1) Hist. Rec. of N.Z., Vol. 1, p. 432. With this report went a table of the results of the twelve experiments carried out; they gauged the breaking strain of the three types of cordage.
(2) R.W.Hay: "Notices of New Zealand", an article in the Journal of the Royal Geographical Society of London, Vol. 2, p. 136.
(3) C.H.B.E., Vol. 7, Pt. 2, p. 112 - extracts from Bigge's instructions are given in this volume, and the circumstances surrounding his commission.

Consequent upon his investigations at least five reports were received on the behaviour of rope and twine made from New Zealand flax under test and working conditions. Some of these reports came from masters of ships stationed in Australia, and one from an officer, Fenwick, at the Chatham Rope Yard. On the whole they presented a favourable picture of the worth of Phormium, and hope in this New Zealand product was rekindled. Official circles, however, must have appeared at times to be altogether impervious to these changes: for the promoters of Phormium tenax as a raw material for naval stores, the 'wheels of state' turned painfully slowly.

The first report from trials with Phormium rope came early in 1820 from the Master of the Store Ship "Dromedary", stationed at Sydney Cove. This report spoke favourably of the work done by the experimental Phormium rope, manufactured by the Sydney ropemaker, Robert Williams. The breaking strain of the Phormium rope was greater than that of the English rope of equal dimensions with which it was compared.(4) The second report was addressed by the officer at the Chatham Rope Yard, W. Fenwick, to Sir Charles Graham in August 1821. As in the case of the first experiments carried out by Fenwick in 1818, here again a chart comparing the strengths of the Phormium and European hemp ropes was given. It made an interesting contrast with the 1818 chart; for in this case the summing up of the test was different: "It will appear from the above trial that the New

(4) Hist. Rec. of N.Z., Vol. 1, p. 511.

Zealand hemp is the strongest, and... from the solidity of its fibre, it will produce more fine hemp for the construction of cordage, lines and twine than Russian hemp ..." (5) Succeeding reports continued in the same vein, remarking upon the fine qualities of the rope, and suggesting ways of overcoming its defects such as stiffening and swelling under wet conditions. On board vessels like the "Dromedary", the sloop "Shamrock", and the "Eliza", the Phormium rope was tested by splicing it on to the end of a piece of new European hemp rope of the same dimensions, subjecting both pieces of rope to the same treatment and work, and comparing their qualities and signs of weakness at regular intervals.(6) The Phormium rope was thus tested in water, as hawsers, in the loading gear of vessels, in all manner of conditions.

The problem of the utility of Phormium products did not lie solely in the quality of the article manufactured, but also in the economy with which Phormium fibre and cordage (or canvas) could be produced. It will be remembered that Robert Williams in his memorial stressed the rapidity with which the process of manufacture could be carried on. Both this and the question of the amount of waste taken from the raw material in manufacturing the fibre and the rope, had to be taken into account. Messrs. Simins and Company, who manufactured rope from the New Zealand flax, left a very encouraging table (but one which must be

(5) Ibid., p. 512. Contrast this with the former report (footnote (1) above).
(6) From the "Shamrock", ibid., p. 514; and the "Eliza", ibid., p. 515.

accounted very imperfect by modern standards of manufacture!) of the weight of dressed and spun yarn obtained from a given weight of raw material. From a parcel of flax in the rough state and weighing twenty-three pounds, the manufacturers claimed to obtain eighteen pounds of dressed fibre, four pounds of "toppings" - presumably tow - and only one pound of waste. Under the term "waste" must have come all the vegetable matter separated from the leaf. It may have been, however, that the "rough state" referred to was in fact a partially-dressed state.(7) The advantages of the high productivity of the Phormium leaf must have appeared striking compared with the European hemp from which a great amount of waste material was extracted.

Already there has been occasion to notice the interest taken by the Church Missionary Society in the potentialities of Phormium. At the same time as Commissioner Bigge was investigating (and was having tested) the usefulness of New Zealand flax, the Church Missionary Society forwarded to the Navy Board further specimens of the New Zealand fibre, asking the Board to subject the samples to trial and report back to the Society that they might be able to instruct their Australian missionaries how to act in respect to the uses to which Phormium might be put in the future.(8) There came back the reply from the Navy Board, dated 6th April 1819,

(7) Ibid., p. 511 - enclosed in a report of Bigge, 15 October, 1821.
(8) A letter from Rev. Josiah Pratt in London to the Navy Board, dated 1st April, 1819.

> "I have laid before the Committee of the Navy your letter of the 1st instant, and am commanded to acquaint you that they have already made satisfactory trials of Rope manufactured from samples of New Zealand flax with which they have been furnished; and in consequence thereof the Admiral Commanding in Chief in the East Indies has received instructions to encourage the growth of New Zealand hemp by procuring rope manufactured therefrom for the use of his Squadron "(9)

This reply must have been most encouraging for the enquirers, but it is doubtful that the orders of the "Admiral Commanding in Chief in the East Indies" were very assiduously carried out. It may be certain, however, that there were ships which constantly used Phormium ropes, particularly whalers and other craft sailing in Australasian waters.

In the previous chapter a number of colonising proposals were discussed. In varying forms similar plans were repeatedly outlined and sponsored throughout the period of this chapter, 1818-1838. The first of them was moved by a man, Robert Sugden, in January 1821 in a letter addressed to Lord Bathurst.(10) A feature of this scheme, and one common to many of the plans submitted to the Colonial Office from this time forward, was the way the organisers went about their requests for protection. When all their own plans were made, and on the eve of departure, they requested "most respectfully to solicit the assistance of the Government in their undertaking", being convinced that the colony they were aiming to establish would be a success and a national asset in future years. All the advantages of colonising New Zealand were pointed

(9) Signed for the Board by Abe Nelson, dated 6 April, 1819, and addressed to the Secretary of the Church Missionary Society.
(10) Hist. Rec. of N.Z., Vol. 1, p. 516.

out, commencing with supplying England with all the fibrous naval stores she needed, thus freeing her from dependence upon the Baltic countries, especially Russia. Sugden concluded these advantages by pointing out that New Zealand and its natural products were so valuable to the civilised world, that, if Britain did not colonise this country, some other, perhaps unfriendly, European power would be bound to do so.

In the meantime, however, commercial interests had been at work; in February 1822 their representations to the Committee of the Privy Council for Trade had been so strong that that Committee suddenly awoke to the possibilities of trading in Phormium fibre and sent off a letter to the Colonial Office:

> "The Lords of the Committee of the Privy Council for Trade having been informed that flax of a very valuable description is grown in New Zealand, I am directed by their Lordships to request that you will submit to Earl Bathurst the expediency of instructing the Governor of New South Wales to enquire into the subject, and to report thereon for the information of this Committee; and also to collect and send Home a small quantity of such flax by way of a specimen, in order that its character and quality may be ascertained by proper experiments."(11)

If one read between the lines it was evident that the Lords of the Privy Council, who had but recently discovered the possibility of using Phormium tenax, were anxious to get the Colonial Office on to the task immediately. A week later, 21 February 1822, the Earl instructed the reply to be sent. Although its language was formally polite its wording

(11) Ibid., p. 577.

left no doubt as to its meaning. Earl Bathurst's secretary informed the Lords concerned that Commissioner Bigge had "already directed the necessary experiments to be made on a quantity of this flax ... the result of which will be duly laid before their Lordships when the report of the Commissioner is received".(12) The Commissioner had been examining the qualities of Phormium for three years and the Committee for Trade were not aware of it; they were now to await the official report.

The Imperial Government, through its various departments, was busy enquiring into the qualities of Phormium products; but, as has been noted at the beginning of this chapter, there remained the problems of economically producing the fibrous articles with which the Imperial Government's investigators were concerned. It may be said that the task undertaken by merchants at various times, and by the New South Wales Government in 1822 - that of solving the problem of economically gathering and dressing the leaf for the fibre - was a prior and even more difficult job than that faced by the experts in England. Before 1822 there was a lengthy list of bankrupt and abandoned enterprises against the obtaining of Phormium fibre. The end of 1822 and first quarter of 1823 saw yet another attempt to solve this pressing problem.

On 6 November, 1822, the "Snapper", under the command of Captain Edwardson, sailed from Sydney for the South of New Zealand.(13)

(12) Ibid.
(13) R. McNab: Murihiku, p. 199 ff. - The account is given by M. Jules de Blosseville, who sailed with M. Duperrey in southern waters in 1824.

His instructions were from the New South Wales Government to find suitably rich 'deposits' of Phormium tenax, to try out the two machines he took with him, one large and the other a small one. Williams in 1813 had found that the areas where Phormium thrived were those devoid of any substantial timber. Edwardson was to experience the same difficulty. Goulburn Island,(14) where there was an abundance of flax, was cut off from any reasonably large wood supply. This meant that there was a paucity of firing for heating the water through which the leaves were passed during the process of dressing the flax. The machines were given a trial on the beach. Close by, two native women flax-dressers were engaged to hand-dress flax for eight hours in their usual fashion. The machines were the object of scorn and the source of much comical entertainment to the Maoris who stood by and watched the 'competition'.(15) The results were rather lamentable for the white men:

> "'Ten men working eight hours, boiling and then preparing the Phormium with the large machine only produced sixteen pounds, - a much smaller quantity than the women could finish. In fact a woman working very quickly could make ready nine pounds a day, but the average result of steady work was five pounds a day ... The only instrument used by the women was a mussel shell sharpened on a stone.'"(16)

The "Snapper" continued its trading voyage until March 1823, when it

(14) "'called Goulburn in honour of the Secretary of the Government of New South Wales who had taken great interest in the advantages to be obtained from Phormium.'" - Ibid., p. 203. Frederick Goulburn, whose brother Henry Goulburn was British Under Secretary for the Colonies, 1812-1821, held the post of Colonial Secretary of New South Wales, 1820-1824. (Johns: Australian Biographical Dictionary, p. 144.)

(15) Ibid.; and quoted by A.H.Reed: The Story of Otago, p. 81, 83.

(16) R. McNab; op. cit., p. 203.

returned to Sydney with an assorted cargo and a poor report. "'The ill success of the "Snapper's" voyage having shown the defects of the instruments and the need for a larger ship, they sent the next year on the same errand the Sloop "Mermaid", ... and the scheme was drawn on a much larger scale.'" (17)

Under instructions to trade in flax in those areas mentioned by Edwardson as propitious for such trade, Captain Kent of the "Mermaid" sailed for Stewart Island. He was welcomed by the natives, but his descriptions of the stunted, wind-withered flax of the island seem to run counter to those of Captain Edwardson. Despite the fact that it was the wrong season for harvesting the Phormium leaf, and that the plants were blighted, Kent persevered in cutting and packing the green leaf; for, as he said:

> "not knowing of any place but this about Foveaux Straits where flax could be got except at the Old Man Bluff, which place according to Mr. Edwardson is by no means adapted for a vessel getting a cargo on account of the impracticability of anchoring safely; and as the flax here is represented by the natives equal to any that is to be found I therefore commenced loading, taking care to pick out the most healthy blades." (18)

After proceeding to examine the areas around Bluff, mentioned by both Williams and Edwardson as good for flax (though not for loading), Kent repaired to Ruapuke, or Goulburn Island. Here again the flax was

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(17) Ibid.

(18) Log for 21 June, 1823. - This log, held in manuscript in the Mitchell Library, Sydney, is published in Appendix F of B. H. Howard: Rakuira; Stewart Island, p. 342-354.

battered by the severe winds; but the ship was loaded. It was slow work, entailing careful supervision and a constant fight with the wintry conditions. At last Kent succeeded in obtaining his complement and in persuading two native women, Caddell's wife, and the wife of the chief, To Whero, to accompany him to Sydney (together with their friends and family) to dress the flax which he had collected. Kent, however, was obviously not pleased with the area for flax-gathering, stating his preference for longer and healthier leaf found in more northerly parts of New Zealand. From the point of view of obtaining Phormium tenax for commercial purposes, one could not say that the voyage of the "Mermaid", while important, was a success.(19)

Although ill-success dogged the steps of those who came to New Zealand to try to gather the flax, there were still those in the Homeland who were unperturbed in their optimism. In 1823, while the sloop "Mermaid" sailed around the coasts of New Zealand, at least two people in England were contemplating ways and means of establishing the value of Phormium tenax by founding colonies in this country. In November, Lieutenant-Colonel Edward Nicolls of the Royal Marines forwarded to Lord Bathurst the summary of his deliberations in a memorial which followed in many respects the appeals of Robert Sugden nearly three years earlier.(20) It was claimed that Britain should no longer be dependent upon the Baltic countries for her naval stores, especially when

(19) Ibid., Chap. 7, passim. - Both Edwardson's and Kent's voyages are recounted.

(20) Hist. Rec. of N.Z., Vol. 1, p. 698 ff.

there were alternative supplies likely to be available in a land which could easily be declared to be British territory. Further, the New Zealand flax needed very little cultivation; the supply was plentiful; and it could be cheaply worked. Nicolls corroborated his opinions with those of two sail-makers, Young and Dempster, the latter of whom was the patentee for the naval sail-cloth known as Dempster Patent Canvas.(21) But Nicolls seemed not to realise - as was the case with many would-be colonisers who followed him - that the Navy Board had refused to act upon any of the proposals submitted to them because they were not certain that naval stores could be guaranteed when their source was over twelve thousand miles away, even though it may be a British colony.

Was New Zealand to be considered British territory? Another man, the Baron Charles de Thierry, in 1823 seemed to think so by his representations to the British Government. The reply which he received refuted such a belief (22) - and it seems that this letter from Downing Street might well have been addressed to others who were thinking as Baron de Thierry was. He wanted to be able to trade and colonise in northern New Zealand, in an area he claimed to have bought. He aimed at trading in flax and setting up a factory to barter with the natives for the dressed fibre. Despite the official reply de Thierry persisted

(21) Ibid., p. 609.
(22) R. McNab: Murihiku, p. 203.

with his plans, still seeking British imperial support, and suspicious that such support was being given to rival schemes, especially that of Captain William Stewart, after whom Stewart Island was named, and who (Robert McNab thought) possibly was employed at one time by the Baron.(23) The latter, however, received no official support for his trading and colonising proposals in the North Island, and it foundered like all its predecessors.

In 1825 two other schemes were being worked out, one in the far north, in the Hauraki and Hokianga area, and the other in the far south, on Stewart Island under the command of William Stewart. All these three prospective colonies were to be founded for trading in flax and timber; and as they were one in their aim, they were also alike in their end, - they all failed.

To consider the southern-most plan first, Captain Stewart negotiated with the merchants, T. and D. Asquith, who, when Stewart arrived in Sydney in the "Prince of Denmark" in March 1825, wrote to Earl Bathurst at the Colonial Office, seeking to guarantee their scheme against any encroachment by the northern colonisers.(24) They had purchased a second ship, the "Lord Rodney", and had expended some £5,000 on the venture. It was not until May 1825, however, that Stewart embarked

(23) Ibid., p. 238 ff. - De Thierry claimed to own the most of New Zealand by right of purchases from the Maoris; but in fact he had bought only one piece of land, according to the report of Dumont D'Urville from a conversation with Rev. H.W.Williams. (Miss O. Wright: New Zealand, 1826-1827 ..., p. 191 ff - D'Urville's Journal.)

(24) R. McNab: op. cit., p. 240 ff.

from Sydney to survey his prospective colony at Pegasus Harbour in Stewart Island. The voyage was a failure, only four hundred and fifty skins being collected - scarcely enough to pay the crew's wages. On his second trip he persuaded seven men[25] from the Bay of Islands to go with him and pioneer the proposed timber and ship-building yard at Port Pegasus. Having set up the new colony, Stewart returned to Sydney in September 1826 with only four hundred and sixty seal-skins and one and a half tons of flax. This meant that the second voyage, like the first, showed a deficit. The third and final trip to New Zealand began in November 1826 from Sydney, in the last feverish attempt to redeem the losses of the previous two voyages. But it failed too. The inevitable result was that in September 1827 the "Prince of Denmark" was auctioned complete with tackle and furniture to assist in meeting the creditors of this venture in southern New Zealand. "Stewart's colonisation and trade scheme ended in disaster. His two rivals in 1825 did not do much better, both schemes resulting ultimately in failure and pecuniary loss."[26]

The New Zealand Flax Society - later renamed the (first) New Zealand Company - was formed in England to gather flax and fell timber for trade. It proposed setting up a colony in northern New Zealand, about the Hauraki region. By April 1826 the ship-load of colonists was in New Zealand waters under the command of Captain Herd, and in that month they

(25) Among them was George Cook whose son remained as a shipbuilder on Stewart Island all his life.
(26) R. McNab: Murihiku, p. 249.

visited Stewart and his infant colony on Stewart Island. While on the island, Shepherd (believed to be the surveyor in Herd's expedition) carried out some experiments with the local flax, even though "it is reported here that it is a bastard (hybrid?) kind called by them (Maoris) the wood flax and not fit to be manufactured into flax."(27)

After some weeks on Stewart Island, the Company colonists proceeded to their North Island site, and the colony was founded. Shortly, however, they were forced to flee from their settlement under threat of a sudden massacre by the Maoris. They moved to the mouth of the Hokianga Harbour where they stayed but little time - being welcomed by a Maori war-dance. Finally, deciding that the alleged advantages of settling, and trading in flax, were non-existent, and the attentions of the natives too warlike, they took their departure from New Zealand and proceeded to New South Wales.(28) The plans for trading in timber and flax for building and naval purposes had not been given a trial: and the third of the attempts in 1825-1826 to colonise New Zealand for the purpose of using Phormium had failed.

Despite these set-backs to the advances many men wished to see in the utilisation of Phormium tenax, there was a constant interest taken in bartering with the Maoris for flax, either in its raw state, or as

(27) Shepherd's Journal, 18 March 1826. Held in manuscript at the Mitchell Library, Sydney, published in Appendix G, B. H. Howard: Rakiura; Stewart Island, p. 361, also p. 71; R.McNab, op. cit., p. 243.

(28) D'Urville's Journal. - Miss O. Wright: New Zealand, 1826-1827 ..., p. 193. - This scheme had cost over £20,000. (See R. McNab; op. cit.) Dumont D'Urville gave his account of this venture from a conversation with Rev. H. W. Williams on 15 March, 1827.

dressed fibre. Dumont D'Urville, the greatest of the French seamen who had called at New Zealand, records that, during his visit to these shores at the end of 1826 and the early months of 1827, he had occasion to do business with the Maoris who were very canny, and even sly, 'merchants'. He noted their insatiable desire for metal goods, especially weapons.(29) After lengthy discussion he succeeded in obtaining a boat-load of flax to be used as tow and to be the subject of his naturalists' attention and experiments. D'Urville seemed disappointed in places where, on one occasion, he had expected to find an abundance of Phormium and found none, and, on another, where both the quantity and quality did not come up to his expectations. This would rather seem to indicate that he had heard much about this native plant of New Zealand.

The year 1827 saw a reversion to an old theme, that of using the profits from trading in New Zealand flax for financing organised schemes of immigration into New South Wales. Such was the tenet of a new proposal formulated by Colonel Torrens. He argued that, at the contract prices of the Navy Board for hemp, a five-hundred-ton transport could return to England with a £20,000 cargo of flax, or a timber cargo worth £8,500. On these grounds he preferred that all the ships used for immigration should return with full Phormium cargoes, thus,

(29) D'Urville's Journal (Miss O. Wright: op. cit., p. 199). - J. C. Beaglehole speaks the highest praise for D'Urville as a man and a navigator, rivalling Captain Cook in excellence: The Discovery of New Zealand, p. 121 f. - D'Urville sailed in Duperrey's vessel, the "Coquille", which was renamed for his voyage, the "Astrolabe".

on each return journey defraying "the whole expenses of locating one hundred families in New South Wales".(30) Torrens argued that it was on precisely those grounds upon which the Navy Board had rejected previous similar proposals that the strongest case for immigration to New South Wales and reciprocal trade could be made, thus ensuring both a steady increase in the population of that young colony and also a constant flow of cheap raw materials into the rope yards of the British Navy. This time, however, the reply came that vessels in which one could later store cargoes of flax were not fit ships in which to expect women and children to sail half way round the globe to Australia. From this change of emphasis in the official communication it would seem that the Navy Board was unwilling that either such trading or immigration schemes should be implemented.

A year later, in July 1828, the last of this long series of short proposals for colonising for the purposes of trading in flax - proposals which had occupied men since the turn of the century - was sent to the Lord High Admiral by Samuel Curtis. He advocated the cultivation of Phormium in New South Wales where he had seen it growing so luxuriantly, pointing to the national importance of the scheme (almost a trite point by now!) and reviving the idea of the later years of the previous century that the convicts could very profitably be set to work the flax for Imperial interests.(31) The Admiralty forwarded the letter to the Navy

(30) Hist. Rec. of N. Z., Vol. 1, p. 676.
(31) Ibid., p. 684-685.

Board for discussion and a report. The latter's reply formed a neat summing-up of all the trouble it had been put to by those interested in the prospects of using Phormium tenax, - by the Admiralty, the Department of State for the Colonies, the Emigration Board, the Committee of the Privy Council for Trade, and by various 'outside' interests like the Church Missionary Society.

> "...we beg to state, for the information of H. R. H. the Lord High Admiral, that we have frequently had this subject under our consideration, and that there is no doubt, from the result of the trials made at Woolwich and Chatham in the years 1821 and 1822, as well as on board the Wellesley at a subsequent period, of which we received the report of the captain in February 1827, that both the hemp and flax of the growth of New Zealand are equal in quality to the same article imported from Russia."(32)

After mentioning that the subject of cultivating the plant had already been discussed in consequence of overtures from the Emigration Committee through Viscount Goderick in 1827, the Navy Board concluded by expressing the hope that their reasons for rejecting all previous plans - the expense of cultivation, the uncertainty of supplies through bad crops and communications, and the availability of stores from other friendly powers - would be considered by the Lord High Admiral to be cogent in reference to Mr. Curtis's project.

If, in the first thirty years of the century the Navy Board had shown no desire for utilising Phormium, it was not for want of lengthy consideration.

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(32) Ibid., p. 683.

Before proceeding to the next decade with its rather different problems - those mainly concerned with the processing of the leaf for extracting the fibre - we might do well to consider briefly the volume of trade which was increasing in the later eighteen-twenties, and which was to swell appreciably in the next decade. Robert McNab observed, "Significant of coming events in the shape of a decaying seal trade having to be supplemented by another product to make up a cargo, we find the regular sealing craft, the "Alligator", after her boat had been stolen by the natives, bringing two tons of flax to Sydney in October (1825), along with her cargo of 1400 seal skins."(33)

The "Sydney Gazette" came to make frequent references to the progress made in the flax trade. Its shipping notices for 24 August 1830 showed that the majority of ships in New Zealand waters or recently arrived in Sydney from New Zealand were carrying substantial cargoes of flax.(34) In the same issue, news of brighter commercial prospects and better prices for Phormium tenax on the London market were reported - "So highly is it esteemed in the marine departments of Government that they are purchasing it at no less than £45 per ton. This is a sweeping addition to our exports, and ... the most sanguine hopes may be indulged as to its commercial advantages to the colony."(35) Later in the year(36)

(33) R. McNab: Murihiku, p. 259-260.
(34) The Sydney Gazette, 24 August, 1830, p. 2.
(35) Ibid. - This seems not to have lasted long, nor from M. J. J. Donlan's account of events and opinions in England (later in this Chapter) can it be thought that the Sydney Gazette had much upon which to build "sanguine hopes".
(36) Sydney Gazette, 23 November, 1830, p. 2.

there appeared an article intimating that Phormium plants had been introduced into Australia on a commercial scale, and calling for correspondents to contribute opinions on the merits of Phormium for Australian cultivation.

In his book The Old Whaling Days, Robert McNab outlined the arrival of vessels at Sydney with cargoes of seal skins or with mixed cargoes. From all the vessels he mentioned, those carrying flax may be extracted and shuffled to form an interesting table, showing the trends in flax trading between New Zealand and Australia throughout the eighteen-thirties. From rather erratic beginnings in the later 'twenties, the trade developed well until 1832 after which date there is a fairly sharp 'tailing-off' both in the number of ships engaged in the trade, and in the quantities carried in each cargo. (Neither McNab's account of the shipping, nor this chart, however, is meant to be comprehensive of all the trading done across the Tasman Sea.)

DATE (37)	SHIP	TONS	SOURCE (38)
24 June 1830	Tranmere	?	From Cook Strait.
13 Aug. "	William Stoveld	25	" " "
11 Oct. "	Industry	21	" " "
23 Oct. "	Waterloo	14	" " "
.....			
14 Jan. 1831	Elizabeth	30	From Cook Strait.
8 Feb. "	Currency Lass	30	" " "
5 Mar. "	Speculator	13	" " "
9 Mar. "	Waterloo	15	" " "
28 Mar. "	Argo	55	" " "
6 Apr. "	Farley	½	From Foveaux Strait.
27 Jul. "	Currency LASS	20	From Cook Strait.

(37) The dates represent the date of arrival of the vessels at Sydney.
(38) The "Source" of supply is here named broadly; e.g., "From Cook Strait" includes supplies taken from Kapiti Island.

DATE		SHIP	TONS	SOURCE
13 Feb.	1832	Currency Lass	17	From Cook Strait.
29 Feb.	"	Lucy Ann	½	From Foveaux Strait.
9 Jun.	"	Admiral Gifford	11	From Cook Strait.
12 Nov.	"	Vittoria	37	" " "
?	"	Caroline	26	From Foveaux Strait.
?	"	Bee	(700 baskets)	" " "
20 Jan.	1833	Emma Kemp	?	From Cook Strait.
7 Nov.	"	Lucy Ann	1	From Otago Harbour.
31 Dec.	"	Joseph Weller	(33 bales)	From Foveaux Strait.
14 Mar.	1834	Sydney Packet	14	From Foveaux Strait.
26 Apr.	"	Lucy Ann	3	From Otago Harbour.
	1835	Children - No mention of quantity, nor source, but completed in 1835; carried wool also.		
12 Apr.	1838	Hannah	(25 bundles)	From Foveaux Strait.
8 Aug.	"	Martha	? (small)	From Bay of Islands.
27 Dec.	"	Magnet	1¼	From Foveaux Strait.
10 Feb.	1839	Jessie	(32 cwt.)	From Otago Harbour.
20 Feb.	"	Hannah	½	From Cook Strait.
29 May	"	Hannah	?	" " "

M. J. J. Donlan, in his article Phormium Tenax or Neptune New Rigg'd, quoted the official figures given by the Inspector General of Imports and Exports, for the importation of Phormium in the years prior to his writing. In 1829 that imported directly from New Zealand was only 44 cwt., but the total imports were 2,586 cwt., the remainder coming from New South Wales. In the following year all of the 6,246 cwt. imported came from New South Wales. In 1831 from New Zealand direct came

890 cwt. out of a total of 16,615 cwt. for that year.(39) There was the tendency growing up for importing direct from New Zealand instead of landing the flax in Sydney and transhipping there to England.

If in the decade of the 'twenties, which has just been discussed, there was a noticeable tendency to give conflicting reports on the qualities and potentialities of Phormium tenax, such was but the prelude to the theme of the succeeding ten years. In an article in July 1831, the "Sydney Herald" outlined what were to be the two problems over which conflicting authorities (and pseudo-authorities in some cases) fought in the period 1831-1838. The paper mentioned the need for better-dressed fibre of Phormium to be put on the English market in order to gain the high prices obtained by Russian hemp - the Maoris had hastily and only partially dressed the flax because of the ready sale the fibre had with the trading vessels around New Zealand. To achieve this object the need for an efficient dressing machine was stipulated.(40) The article stated that in the meantime, no matter how tedious the native dressing process was, no trader should accept anything but the best-dressed fibre; a few inferior hanks could spoil the value of a whole cargo on the English market.

In about 1809 in England Mr. M. J. J. Donlan began his experiments with Phormium tenax, trying to devise some satisfactory means of produc-

(39) M.J.J.Donlan: Phormium Tenax, or Neptune New Rigged, p. 167. This report was obtained through the representations of Lord Teynham on Donlan's behalf in the House of Lords. Provision for this report was made in his Lordship's motion before the House, 29 March, 1832 (see footnote 50, below).

(40) The Sydney Herald, 25 July, 1831, p. 2.

ing well-dressed fibre, and articles of value from this plant. After a long struggle against the opposition of the Navy Board, against whom Donlan bore a grudge for many years, he addressed to the King in 1833 a pamphlet which summarised all his endeavours.(41) In this lengthy letter Donlan claimed: "I am the first and only person who ever manufactured sail-cloth from Colonial produce: consequently my sail-cloth (presented to the Navy Board in September 1829) is the very first that Great Britain could boast of as her own; and it is acknowledged to be the best and strongest ever yet made."(42) On this point Donlan was wrong; he must have forgotten the work of Robert Williams in Sydney, and been ignorant of the sails made of Phormium which were used in 1807 on board a vessel from Sydney to England and commented upon by Governor King.(43) In giving the reason for publishing his pamphlet on Phormium, Donlan complained of the prejudice and ignorance of "the First Lord of the Admiralty and all those in authority under him" against which anyone trying to foster the use of New Zealand flax had to battle.

Donlan claimed that until his discovery only inferior cordage could be produced. He had spent some £20,000 on his experiments, thinking that he would eventually be assisted in freeing Britain from her dependence upon Russia. Two years previously (1851) tests were made at Deptford Dockyard on two sails made by Donlan according to his secret process. They were tested for a year and found to be satisfactory.

(41) M.J.J.Donlan: Phormium Tenax, or Neptune New Rigged.
(42) Ibid., p. viii.
(43) Hist. Rec. of N. Z., Vol. 1, p. 287. This is quoted in Chapter III.

"Neither mildew, heating, nor any of those other ordinary signs of deterioration were in the slightest degree visible upon them."(44) Then twentyfive feet of hose and six feet of suction hose, also made from Phormium and processed with a secret waterproofing substance, were severely tested: they answered well. Donlan claimed to have worked on this preserving process for twenty years. He then remarked rather bitterly,

> "If proper encouragement were given by the public officers of this country, to men, who have really the power to serve the nation, Great Britain would soon stand in a very different position to what she does at present. ('The result would be the increase of our commerce, prosperity of our manufactures, and employment of our people. - The reverse is, declining trade, perishing manufactures, and a starving population.') But zeal and public services are not yet allowed to counterbalance interest and arrogant pretension. May the fruits of Reform effect this, and few will complain."(45)

As a trading proposition Donlan saw distinct advantages for developing the flax trade. It would encourage a more even trade balance for England; it would save her from throwing away many thousands of pounds to the Baltic countries; it would encourage British money to be invested in England by the colonists, who would take British produce and give this valuable material in return; it would aid the abolition of distress in the British Isles and turn attention to the "neglected colonies".

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(44) M.J.Donlan: op. cit., p. 6.
(45) Ibid., p. 12. - He makes a number of references to the Reformed Parliament, after the Reform Bill of the previous year.

He drew attention to the fact that at various times the Navy had decided to investigate Phormium tenax and had dealt with it in its raw state. Donlan warned them of the dangers of doing so without improved methods of manufacture, Phormium being especially difficult to handle. Nevertheless the Navy Board continually rejected Donlan's samples, while at the same time receiving inferior products into their stores. Donlan offered to dress such flax, but repeatedly his offers were rejected, even when he promised to supply some of his own manufactured material at the price at which the Baltic hemp was being imported at the time. He stated that after the Navy had successfully tried his samples, the Board entered the field of 'public purchasers' for that which formerly they had considered worthless, and they passed by the inventor of these new methods which were still secret.

On 2 March 1831, the Navy had let a contract for supplying the Navy with eight hundred tons of Phormium tenax at the rate of £41.15.0 per ton, all eight hundred tons of which (claimed Donlan) would be wasted, since nobody in the Navy knew how to dress and process the flax properly.(46) At the same time, however, it was known that Captain George Harris had devised a method of treating New Zealand flax. He was also the Member of Parliament for Grimsby,(47) which may not have been an unimportant factor in the letting of the contract mentioned;

(46) Ibid., p. 24.
(47) G. Bennett: Wanderings in New South Wales.... 1832-1834, Vol. 1, p. 73 note.

and in Donlan's reference to "interest and arrogant pretension" quoted above. It was further stated by Donlan that British merchants forwarded loans to the Russian agriculturalists to enable them to cultivate the hemp which was imported into England. This he gave as one reason for the antipathy of merchants to the New Zealand flax on the English market.(48)

Some of the reports of the Navy Board on Phormium (including some of Donlan's samples) were refused him. The following reply from the Navy Board was typical of the treatment Donlan seemed to receive:

> "I am commanded by the Commissioners of the Navy ... to acquaint you that it is not the practice of the Board to give copies of their confidential reports, nor can they promise to take general supplies of your prepared cloth, manufactured of New Zealand flax, until they have ascertained the advantages of your plan over others; but you may send the twentyeight yards of cloth mentioned in my letter of the 1st instant (July, 1831), for trial, at your own expense, as suggested." (49)

Donlan obtained the support of Lord Teynham in the House of Lords. There was a spate of correspondence between Lord Teynham and the Navy Board,(50) but the matter of the unpublished reports did not come before the House of Lords. Donlan wrote to Earl Grey, the Prime Minister,(51) but later commented to his advocate in the Lords, "Earl Grey has never condescended to answer the above letter."

After much frustration, Lord Teynham moved his promised motion

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(48) M.J.J.Donlan: op. cit., p. 32.
(49) Ibid., p. 98 - a letter from the Navy Office to Mr. Donlan, dated 30 July, 1831. One of similar sentiment was dated 10 March, 1831.
(50) Ibid., p. 34-39.
(51) Ibid., p. 44-46.

on 29 March 1832,(52) calling for a statement on the trade in Phormium over the three years ended 1st January 1832, and "'an abstract of all Reports received by the Board of Admiralty, or the Navy Board, of experiments on the utility and value of New Zealand flax as a substitute for Russian Hemp and Flax, for all naval purposes ... and in particular all Reports, as aforesaid, on articles submitted for trial by Mr. Donlan.'" He pointed out the grave danger of allowing France to declare New Zealand to be French, in view of the "infant self-planted British emporium of commerce" established at the Bay of Islands.

Earl Grey's reply was couched in language of the same tenor as that used in the letters of the Navy Board to Donlan. He asserted that the reports were too voluminous to be presented to the House, and too much time and money would have to be spent to select the appropriate portions. The Earl, however, added that after seven years' serious investigation, "'It appears to have been proved to the satisfaction of the Admiralty, that Phormium tenax cannot be applied to the purposes to which it was supposed to be applicable; and that there is no prospect of its being turned to any beneficial purpose in that respect.'"(53) The voluminous report referred to was found to be only about half a page in length.

(52) Ibid., p. 55 - Lord Teynham quoted Samuel Johnson auctioning Thrale's Brewery: "'I am not here to sell tubs and vats of iron hoops, but to transfer the power of accumulating wealth beyond the dreams of human avarice.'"

(53) Ibid., p. 57.

Donlan proceeded to tell of some of the experiments which were carried out to test the Phormium articles which he had advocated. A piece of hose, having been severely tested at the Deptford Dockyard on 29 December 1829, was closed in a box in a wet condition for a year. At the end of that period it showed no signs of deterioration, was moistened again and left, being finally removed from the box on 29 December 1832 - it had not deteriorated. Donlan set this phenomenal resistance down to his newly discovered preservative, as well as the natural high quality of the material. Further, a fireman in the Parish of St. James, London, attested under oath before the Mayor, in January 1833, that the 'linen hose' (made by Donlan) had endured pressures which had burst a good leather hose; this report was corroborated by the Parochial Engineer of the time.(54) Donlan also claimed that whereas hemp sails imbibed great quantities of moisture in wet weather and froze in winter, making furling a most difficult task, the sails made by him from Phormium tenax and water-proofed by his special process were not encumbered by the weight of moisture and remained pliable in cold weather.

He concluded:

> "It has long been asserted, and I lament to say with too much reason, that, of all countries in the world, Great Britain is the worst, and the last to which anyone would resort for

(54) M.J.J.Donlan: Phormium Tenax, or Neptune New Rigged, p. 68-70. 71-73.

> the introduction of a novelty, so strong is the bias against innovation and the bigoted adhesion to ancient beaten tracks, that scarcely any public institution will hold out the smallest ray of encouragement, to the scientific or the ingenious. A more convincing commentary upon this doctrine than the facts contained in the present statement cannot exist." (55)

Perhaps Mr. Donlan was not to be blamed for his bitterness. He had spent a fortune on his investigations with Phormium tenax, only to have his whole factory, valued at £15,000 razed to the ground by fire in September 1851. Not only were his efforts appreciated but little by the Navy Board, but he had powerful rivals who had commercial interests, and who were supporting the Russian hemp trade. Donlan expressed his suspicions regarding the cause of the fire and his satisfaction that those who broke into his factory learned nothing of material benefit to themselves, in a letter to the "Sydney Morning Herald".(56) This, however, was not the last which was heard of M. J. J. Donlan, but in the next decade he was to play a rather more successful role, and to continue his arguing, only on the second occasion with the New Zealand Company.(57)

What of the situation in Australia and New Zealand itself while this controversy raged in England? There was certainly no marked prejudice against using Phormium ropes among the colonial traders,

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(55) Ibid., p. 160. - G. Bennett: Wanderings in New South Wales ... Vol. 1, p. 74, expressed regret at the prejudice against Phormium in England in 1833-1834. He attested to its value in Australasia.
(56) Sydney Morning Herald, 8 October, 1832, p. 2.
(57) See Chapter V, below.

whalers and sealers. R. W. Hay, in documents to the Colonial Office, in 1832, remarked that settlement was going ahead in New Zealand in those parts where Phormium was being collected, because of the Maoris' reluctance to gather and dress the leaf for the traders. Of fifteen important districts specially mentioned in notes on a chart of New Zealand, seven he noted for their Phormium 'deposits'.(58) Maclaren, whose factory was situated on the north shore of the Sydney harbour, had several establishments in New Zealand in 1833 for gathering flax and making it ready for export either to Sydney or to England; and Bennett commented on the care with which Maclaren prepared the fibre he was sending to England.(59) While Maclaren was unable to produce rope which was cheaper than that which a ship in England could purchase for her stores, he could sell Phormium rope to the colonial ship-owners more cheaply than they could buy European rope which had been freighted to Australia. Accordingly he had a growing trade with the increasing volume of shipping based in Australia and plying the Tasman Sea. Moreover, Bennett found "it (Phormium rope) has been used three years and upwards as running gear for shipping, and highly approved of..." (60)

In order to establish and preserve law and order at the Bay of Islands, in 1832 a British Resident was sent to the Bay of Islands, James Busby, who soon showed a deep interest in Phormium as the possible

(58) R.W.Hay: "Notices of New Zealand", in the Journal of the Royal Geographical Society of London, Vol. 2, p. 133 ff.
(59) G. Bennett: Wanderings in New South Wales... 1832-1834, Vol. 1, p. 72 ff.
(60) Ibid., p. 78.

commercial staple for New Zealand. In that same year the English paper, "Scotsman" quoted Busby as recommending that the Government should foster the fibre trade with New Zealand for the mutual benefit of England and what was to be her new colony. And at the same time, Rev. H. W. Williams remarked that "'there is scarcely a part of the coast where Europeans are not settled for the purpose of procuring flax.'" (61) These factors, - the growth and permanence of the new settlements - were to play a very important part in the events leading to New Zealand becoming a British colony.

At the time there was no slight confusion over the status of New Zealand. It will be remembered that, ten years earlier, the Colonial Office informed Baron Charles De Thierry that he was "misinformed" if he thought that these islands were British. In 1833 Mr. George Webber, for whom Stewart's ship-builder, Cook, had made the schooner "Joseph Webber", enquired of the New South Wales Customs officials whether he could register his vessel as being British, and - if this was not possible - whether the cargoes he carried from southern New Zealand to Van Dieman's Land and New South Wales would be classified as 'foreign' and charged duty. The officials in reply informed Webber that, while "vessels built in New Zealand can bring the produce of that island only to New South Wales and Van Dieman's Land, and that hitherto no duty has

(61) A.J.Harrop: England and New Zealand, p. 9.

been levied upon such produce in this colony ... (they, however, were) invested by no law with authority to grant licence to foreign built vessels, which (precluded them) in this instance from complying with (his) request."(62) This difficulty was later overcome when orders from London gave the colonial officials power to register ships built in New Zealand. This, then, was the situation, that appreciable numbers of British subjects had settled in various parts of New Zealand, many to trade in Phormium tenax; there had also grown up the need for transporting this article of colonial commerce. Britain had to recognise the colony as hers eventually through the sheer weight of numbers in England, in Australia, and in New Zealand, desiring that New Zealand be annexed.

In 1783 James Matra had stated that one of the purposes for which Phormium tenax might well be used was the making of "the finest cambrick".(63) The finer uses for Phormium seemed to have been lost in the midst of the commercial affairs of the following years; but in 1836 John Murray wrote a book on the value of Phormium tenax and had it printed on paper made of Phormium. In the course of his discussion he deplored the poor quality of ordinary paper.(64) Not many people, however, seem to have shared Murray's liking for the idea of using Phormium in this way.

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(62) R. McNab: Murihiku, p. 247 f.
(63) Hist. Rec. of N.Z., Vol. 1, p. 36, quoted in Chapter III.
(64) A copy of this book is held in the Alexander Turnbull Library, Wellington. - A note is given by T. M. Hocken: Bibliography of New Zealand Literature, p. 59; also in a lecture by Mr. Kirk, Transactions of the New Zealand Institute, Vol. 3, July, 1870.

An allusion has been made to the popular agitation on the part of the Australasian colonists to the British Government to have New Zealand annexed to the British Crown. Many in Australia were desirous of placing New Zealand as a kind of protectorate under New South Wales. One of the chief causes of this agitation, as has been noted, was the need for establishing law and order in the Bay of Islands. But the activity of the French (most notably and recently D'Urville) in Australasian waters also caused anxiety in Sydney and in New Zealand. Some have questioned whether there was any foundation for the rumours which were current in Australia that the French were planning to settle in either New Zealand or (worse still) on the remoter portions of the Australian coast. The following paragraph from a French article suggested something of what the British colonists feared:

> "'New Zealand must belong only to the natives who inhabit it, and who form a numerous population, asking only to be civilised. This population must be allowed to choose its own head, and those of our ships attracted to these shores by the whale fishing, or commercial affairs, have an interest in finding there an independent nation which the flag of Great Britain does not protect. Let it not be forgotten that the territory of New Zealand is rich in timber for masts and building, rich in that famous flax known by the name of Phormium tenax, the use of which might become so precious for our marine. Shall we allow these commercial resources to be one day exploited without our taking part?'"(65)

This statement in 1838 - while it came by way of a French protest against increasing British interest in New Zealand following the appointment of James Busby as Resident in 1832 - indicated the attitude of the

(65) Annales Maritime et Coloniales (1838), tome i, p. 457 - Quoted By A.J.Harrop: England and New Zealand, p. 111.

French to the potentialities of Phormium fibre. Their interest in Phormium was a very real one.

Renewed British interest had taken the form of extensive investigations on the part of the House of Lords which set up a Select Committee to enquire into 'The present state of the Islands of New Zealand.' Their findings, together with all the Minutes of Evidence which had been taken during long interviews with all kinds of people interested in New Zealand, and reports from experts detailed to examine specific things (e.g. the possible utility of Phormium tenax), were published in 1838.(66) The investigations had been carried out over the period 1832-1836. Some twentyone responsible persons were set to examine the usefulness of Phormium at dockyards and on vessels in all conditions and in various parts of the world. Of the twentyone reports received six spoke highly of the articles of New Zealand flax which they had to use and test; an equal number neither praised nor condemned its products; and the remaining nine reports found that the Phormium fibre articles were inferior to those made from European hemp. A closer analysis of the reports revealed that of the six who praised the Phormium ropes, four came from ships and two from shore stations; those which one might classify as 'indifferent' comprised five vessels and only one station; and of the nine reports declaring Phormium to be inferior,

(66) The Present State of the Islands of New Zealand, a report by the Select Committee of the House of Lords; the special reports are found in Appendices to the evidence - British Parliamentary Papers 680.

only three came from ships and five from widely dispersed stations (there was one which gave two reports).[67]

Some reports objected to the tendency of Phormium to swell - this was a common observation; though not all who observed it considered this phenomenon to be a serious defect. Some expressed general dissatisfaction with the Phormium ropes, claiming that the European ones were much more enduring; while others hailed the New Zealand flax rope as a timely discovery, a superior cordage to it not being known for strength and resistance to moisture. Thus no clear lead was given for the succeeding years. Among those who should have been best able to speak with one voice on the 'scientific' utilitarian qualities of ropes made from Phormium tenax, there was a marked lack of unanimity.[68]

The succeeding years, however, did not wait upon the verdicts of Select Committees in England, nor for the leading naval men to reconcile their conflicting views. Of far more importance to later events in New Zealand were the opinions of practical men with colonial shipping interests, such as that of Charles Enderby, a whaler, who, along with many others, gave evidence before some of the Select Committee of the House of Lords. He affirmed:

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(67) Ibid , p. 157-159.

(68) Two conflicting reports are easy to instance: From the "Tyne" "the other tyes (sic) were repeatedly carried away, but Captain Harris's (Phormium ropes) were never stranded;" and from Portsmouth, the Admiral Superintendent "cannot but feel convinced that the defect so generally complained of must arise from the nature of the material.." (Ibid., p. 157)

> "It (Phormium rope) has been manufactured in a variety of different ways; it has been manufactured with tar alone. The fibre is naturally a very harsh and hard fibre; with tar it is still harder... We have combined a composition of Caoutchouc with the tar, and find the answer; but there has been a great prejudice against the flax in consequence of its having been badly prepared...
> "We use it for whale lines; we prefer it for whale lines to any other description of rope, and the whale lines are the most important line we have in our vessel. A whole scbol (sic) of whales may be lost by the parting of a whale line; property to the amount of £2,000 or £3,000 may depend perhaps on a whale line."(69)

These men, working with rope made from Phormium tenax knew both the harshness of the rope, and its hardness which made it of inestimable value to them. They were prepared to go on using it, and so long as they did there was a considerable demand for it. When men next spoke of the value of Phormium tenax to those who cared to settle in New Zealand and work it, they mentioned not only that some day it might be of great benefit to England, but also that virtually unlimited supplies of fibre were required immediately in New Zealand and Australia. The Australian settlements were growing rapidly. New Zealand's native plant, Phormium, could be an inducement for industrious people to settle in this country, just as it had already been the cause of establishing settlements around the coast. These were the prospects which the New Zealand Association, and the New Zealand Company as it became, emphasised; theirs was a picture of extensive factories, a thriving flax industry within New Zealand, and an ever increasing volume of trade in this product. This,therefore,is the picture which must now

(69) Ibid., p. 72-73.

occupy our attention in this discussion, but we must not lose sight of the experimenters and their results which have been considered to the year 1838.

C H A P T E R V.

COLONISATION, 1839-1860.

In the twenty years of experimentation which preceded the period of organised colonisation of New Zealand, it was noted that most of the tests set out to answer the questions raised as to the inherent qualities of Phormium tenax for the various uses to which people had suggested that it might be put. The next twenty years - those which occupy us in this chapter - throbbing as they were with the activity of colonisation, saw the continuation of the experiments; but there was a change of emphasis. The qualities of the New Zealand flax fibre were sufficiently attested to warrant industrial development. One or two men, most notably Mr. Donlan, had already carried out extensive experiments to promote the commercial production of Phormium fibre, but this sort of investigation was stimulated in the eighteen-forties. The problem of stripping the flax leaf for its fibre had been partially answered by Donlan; but this remained the obstacle upon which many hopes were dashed, and the apparently 'bottomless pit' into which much capital was poured, never to be seen again. Nevertheless, the hall-mark of the experimenters of this period was that of their fellow colonists - perseverance.

In the previous chapter it was noted that most of the tests and trials carried out on Phormium, were performed in England: for the most of this chapter, however, the colonial stage was the one set for further experimentation. During the first years of the colony the prospects of

using flax as a staple export were very important because, as various writers pointed out, such exports would assist the colony to become financially self-supporting. Towards the year 1850, however, discussion of this product declined and was replaced by controversies on constitutional issues, by talk of the systems of land purchase and pasturage, and by reports on the production of wool in New Zealand, and on the mineral deposits and gold rushes in Australia and California. Behind all this change, however, men interested in New Zealand flax continued with their attempts to treat the leaf for efficiently producing good-quality fibre; and again towards the year 1860 there was a marked revival of interest and some indication that progress was being made.

Because of the high reputation which cordage made of Phormium fibre had in New South Wales at the end of the decade of the 'thirties, the Rev. Dr. John Dunmore Lang, senior minister for the Church of Scotland in New South Wales, wrote in one of his letters to Lord Durham, Governor of the New Zealand Land Company, of the prospects for trading in Phormium for anyone settling in New Zealand. Remarking upon the success of Phormium ropes and sails in Australian whaling vessels, Lang concluded that, "it is therefore evident that that island will eventually be the Baltic of the Southern hemisphere, supplying the great desiderata - timber and flax - and affording support and employment to a numerous and industrious European population." (1)

(1) Rev. Dr. J.D.Lang: New Zealand in 1839, p. 59 - 64. - Lang was on his way to England when he wrote the four letters which comprise the above publication.

At the same time, 1839, under the signature of the Secretary of the Secretary of the New Zealand Land Company (later, the New Zealand Company), John Ward, a pamphlet with a prospectus of the Company was published, reviewing the potentialities of the colony which the Company hoped to found in the near future in New Zealand. Among the articles in the pamphlet was a statement by Thomas McDonnell, who was reputed to be qualified to speak authoritatively about Phormium tenax.(2) He remarked upon the use the British Navy was beginning to make of Phormium products, the prospect of the incalculable wealth to be gained from milling the flax, and the superiority of its fibre over both Russian and Manila hemps.

> "Fairplay has not generally been given to the flax sent home via Sydney... Cut the plant at the right season, let the flax be well dried, carefully packed in lengths, and screwed; then the superiority of the New Zealand hemp over that of Europe will be manifest, and those prejudices that once existed will vanish for ever."(3)

These assertions in the Company's pamphlet were to be challenged by M. J. J. Donlan in no uncertain terms.

Another organ of the New Zealand Company, the New Zealand Journal,

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(2) J. Ward: Information Relative to New Zealand for Colonists. (This article was published in the New Zealand Gazette, Vol. 1, for 18 July 1840.) The original pamphlet was published a month after the sailing of the "Tory" for New Zealand. (T.M.Hocken: Bibliography of New Zealand Literature, p. 76.) - Thomas McDonnell was appointed British Resident for the Hokianga District in 1835. He was active in the government of the Pakeha community there, and seemed on good terms with the Maori chiefs. After giving up his position in 1837 he took up a post with the New Zealand Company, returning to New Zealand in 1841.

(3) J. Ward: op. cit., p. 26.

in one of its earliest numbers, printed an article on Phormium.(4) Although the contributor's name was not given the editor assured readers that he was "a gentleman thoroughly conversant with the subject". After giving a survey of the events concerning 'prospecting' with flax up to 1840, the writer made a plea for favourable and encouraging treatment of New Zealand flax in England. His was an appeal against the manifest prejudice in the minds of many merchants, manufacturers, and naval men, which had hampered the sale of Phormium on the English market. Confident that Phormium was superior to the European products, the writer solicited a fair and "unprejudiced examination of the comparative advantages of the two". He claimed that the trouble in England was not that she was dependent on foreign supplies for naval stores, but that she was dependent upon one foreign country for those supplies, and a none too friendly state at that. He therefore offered New Zealand's resources as the obvious remedy for this situation. A later article suggested the gradual 'weaning' of the British market from Russian hemp to New Zealand flax without any glut on the market or other detrimental effects on trade; the New Zealand fibre, it was claimed, would be superior in quality and about £10 per ton cheaper than the Russian supplies which realised £40 per ton. (5)

In May 1840, there was, in the New Zealand Journal, the report of a meeting of fibre manufacturers and others in Glasgow, at which the

(4) New Zealand Journal, Vol. 1, p. 7 - 9. (8 February 1840) - Also in the New Zealand Gazette for 15 August 1840.
(5) New Zealand Journal, Vol. 1, p. 25. (7 March 1840)

great prospect of cheaper and better fibre was applauded.[6] The applause, however, was premature, and the prospect a difficult one to realise; for also in May, the New Zealand Company received a very outspoken letter from Mr. Donlan accusing it of assertions "calculated to impose upon, and mislead, the Public".[7] This was the reply of Donlan to the prospect of using Phormium for trade and future wealth in the New Zealand colony, the prospect which was outlined by Ward in the Company's article on New Zealand already mentioned, Information Relative to New Zealand for Colonists.

Donlan's accusation that the statements of the Company were unfounded and intended to convey an impression which could not be substantiated by facts, seemed to carry some truth when referred to his own twenty-five years of experimentation. But the criticisms of Mr. Donlan were not disinterested. He had patented his process of manufacture and water-proofing, and had formed the National Sail and Waterproof Cloth Company. He claimed that he and his company were the only persons in England capable of realising the wealth from the flax trade spoken of by the New Zealand Company's article. Therefore he submitted to the directors of the latter concern that "unless I and our Company... are fairly dealt with by your Directors, it is my further intention to give this letter the most extensive publicity."[8]

(6) Ibid., p. 82 (23 May 1840).
(7) M.J.J.Donlan: Misrepresentations by the New Zealand Company, addressed to all the Directors of the Company.
(8) Ibid.

Towards the end of 1841, however, Donlan seemed to recant somewhat, offering in an address to the Governor of the New Zealand Company, to forgive the Company's "misrepresentations" of the previous year, and suggesting some positive proposals. He would undertake a contract for the National Sail and Waterproofing Cloth Company to send out to New Zealand two hundred selected workers, male and female, between the ages of eighteen and forty, together with machines of Donlan's design to dress the flax. When it was dressed it was to be sent to the New Zealand Company offices, and manufactured by Donlan's Company. He pointed out the advantages to the New Zealand Company which would accrue through the influx of good, guaranteed settlers of industry, through their prosperity, and that of the colony, inducing others to settle in New Zealand and join the flax industry, and through all this being accomplished without the need for great expenditure on the part of the New Zealand Company. Donlan would undertake to provide both emigrants and machines by March 1842; and he would promise to put back into the colony a considerable portion of the profits gained by his Company, because, he stated, he proposed the scheme "with a view to the benefit of the colony and myself."(9) Very little seems to have come of these proposals: they were repeated by Donlan in September 1843.

In 1840 yet another colonising company was formed and included in its Notices a survey of previous reports on Phormium and an indication

(9) M.J.J.Donlan: Observations on New Zealand Flax to the New Zealand Company, 25 November 1841.

of the importance of the native flax plant to the proposed colony. This was the "New Zealand, Waitemata, and Manakou Company", which was formed in Edinburgh, and may have absorbed and superceded the Scots New Zealand Land Company.(10) The Notices of New Zealand, which the new Company printed, surveyed - with some mistakes in detail - the field covered by the enquiry of Commissioner Bigge, the tests of the Dockyards, and the extent of the imports of Phormium into England in previous years.(11) This was the way in which men with colonising aspirations used the resources of the country, mentioning chiefly flax and timber, as possible inducements to the people of the British Isles to emigrate to New Zealand.

What, then, of the influence of this propaganda on those who subsequently found their way to this country? When they arrived in New Zealand, did they proceed to consider ways and means of exploiting the natural resources of their new home? Before the year 1840 had run its course there had been lengthy articles and letters in the colony's paper at Port Nicholson, the New Zealand Gazette, calling atention to the possibilities of using Phormium almost immediately for local and export purposes. An advertisement in December read: "A suitable reward will be paid to any person who may invent a machine to aid manual

(10) Suggested by T.M.Hocken, Bibliography of New Zealand Literature, p. 84. - The new Company was a rival of the New Zealand Company.

(11) In place of Bigge the Notices... had "Rigge", for Busby, "Bushby", and quoted 1828 for the sixty tons of flax worth £2600, whereas R.W.Hay stated the year 1818 for the same figures in "Notices of New Zealand" to the Geographical Society of London (Chapter IV above). Notices of New Zealand (1840) of the Scottish Company.

labour in preparing New Zealand flax or hemp."[12] The machine had to be simple, durable and inexpensive; it was to be worked by one person and to be capable of producing not less than fifty pounds of flax per day for shipment. A fortnight later there was called and advertised a meeting to be held in the lounge of Barrett's Hotel to consider ways and means of preparing Phormium for export; all those interested in the future advancement and prosperity of the colony were urged to attend on 4 January 1841.[13] There followed an article which considered very favourably the prospects of setting up a factory to export Phormium fibre. It was typically hopeful in its prophecy of the ease with which this remunerative industry might be established, and the extent of the exports and consequent profits. It began:

> "The native hemp, or Phormium tenax, is an article of local produce, which, of all others, can, with least delay, and least capital, be rendered fit for export in large quantities..." -

and it concluded:

> "I am of opinion that an establishment of the kind, having extensive rope-works in connection with it, would be one of the best paying investments of capital which can possibly be made in this place..."[14]

By the calculations of the writer, from one hundred acres of Phormium, 1,296 tons of leaf would be cut annually, from which 250 tons of good quality hemp would be extracted and a further 600 tons of coarse tow.

(12) New Zealand Gazette. 12 December 1840, p. 2 - also in Hon. H.W. Petre: Settlements of the New Zealand Company, p. 57.
(13) New Zealand Gazette, 26 December 1840, p. 2.
(14) Ibid. - also Petre: op. cit., p. 59-61.

All that was needed was the estimated £5,000 to erect the factory and machinery to deal with upwards of six hundred tons of hemp annually.

The meeting at Barrett's Hotel was reported.[15] A Committee was set up to publicise the subscription list by which it was hoped to raise £500 from among the colonists to set up a factory. The meeting hoped also for a pound-for-pound subsidy from the New Zealand Company, and further subscriptions from 'absent proprietors'. A substantial reward was offered for a suitable machine, tool, or process invented for efficiently stripping the flax. This was to be offered overseas, in Britain and on the continent, as well as in New Zealand.[16] The constant aim of the meeting and the Committee was to forward this product so that New Zealand might rank "among those wealthy colonies which supply the Mother Country with the raw material of those manufactures upon which its prosperity, if not its existence, now depends."[17] It was suggested that by inventing a suitable machine for dressing the flax, a new important industry - that of machine making - would develop in the colony; but primarily the article gave consideration to the benefit to be derived by both Maori and Pakeha from the constant and remunerative employment which they would have.[18] The rest of 1841 saw the beginnings of the cultivation of Phormium, and the advancement of

(15) New Zealand Gazette, 9 January 1841, p. 2.
(16) Ibid., 13 February 1841.
(17) Ibid.
(18) Ibid., 27 February 1841, p. 2.

several methods of dressing the leaf.[19] Rope was made and sold; machines were designed, built, and improvements effected.[20]

Very little attention had been paid to cultivating Phormium tenax, despite the early observations of a man like the surgeon John Savage, who visited New Zealand in 1807 and suggested that, good though the quality of Phormium was in its native state, "there can be no reason to doubt but that it might be improved by cultivation."[21] In 1842, however, two publications advocated the cultivation of Phormium for surer quality and a properly regulated supply. Charles Terry, who spent a year in Auckland districts cultivating flax, strongly recommended cultivation and a proper investigation into the invention of a cheap, light, durable, and efficient machine for dressing the leaf of Phormium, as the two chief tasks of those interested in establishing the sale of the New Zealand fibre on the English market.[22] The other publication was a pamphlet by F. Dillon Bell and Frederick Young entitled Reasons for the Cultivation of New Zealand Flax. Their conclusion was similar to that of Terry, but they went further in advising the inauguration of a £2,000 company to carry out the measures suggested by Terry and themselves, and to gain a steady market in England for the fibre.[23]

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(19) Ibid., 6 May 1841, p. 2; 13 May 1841, p. 3.
(20) Ibid., 3 April 1841, p. 2; 17 April, p. 3; 11 Sept., 1841, pp. 1, 3; 30 Oct. 1841, p.2-3; 20 Nov. 1841, p. 4.
(21) J. Savage: Some Account of New Zealand, p. 8.
(22) C. Terry: New Zealand, Its Advantages and Prospects as a British Colony, p.238-241. - Terry returned to Auckland in 1843 to set up a factory.
(23) F.D.Bell and F.Young: Reasons for the Cultivation of New Zealand Flax.

Flax-dressers from England settled in Wellington and Nelson and carried out continual experiments to devise some efficient method of preparing the fibre for the manufacturer, whether in England or in the colony itself. Repeatedly the newspapers seemed to report that "they are themselves exceedingly sanguine, and speak with the utmost confidence of their success... We confess to have found their confidence somewhat catching..."(24) And repeatedly, for some inexplicable reason, their hopes were dissolved in failure and disappointment. As time passed new schemes for using Phormium were thought out and tried; perseverance was the attribute of all who were occupied with this recalcitrant plant which set about its strong fibres a viscous gummy mucilage which it seemed impossible to separate from the fibre.(25) Yet it would seem that many of the colonists were quite apathetic to the struggles of the few keen persons thus engaged in trying to manage the New Zealand flax.(26) The uninterested colonists were concerned with their immediate needs to exclusion of all thought of the ultimate benefit which the papers and the enthusiasts said would accrue from the exportation of good fibre from New Zealand.

It was suggested by the Nelson Examiner that the European colonists should be taught how to dress the flax after the Maori fashion

(24) Nelson Examiner, Vol. 1, p. 150 (26 November 1842).
(25) The inventor of the modern stripping machine tried all manner of methods of stripping flax for many years. He is said to have discovered the present method by hitting the leaf on an anvil in a rage.
(26) Ibid., p. 178 (14 Jan. 1843); p. 207 (4 March 1843).

so that, even before a machine was invented, there could be some fibre exported and a market established in England. Thus, it concluded, it was the duty of all settlers to be interested in Phormium; and it would be to their profit to learn the native method of stripping the flax. By these means, it was said, the labourer could substantially augment his wages.(27)

In the meantime the experimenters persevered. In Nelson, Messrs. E. J. Wakefield and Partridge were very helpful, making it possible for some of these men to continue their experiments. After several failures (on some of which schemes the newspapers had built high hopes) it was suggested that the leaf was being cut at the wrong time, the poorest varieties were being harvested, and so forth; and it was held that the first step had to be the proper cultivation of the plant. Hopes were held for skilled selection and cultivation through the experiments carried out and advice given by the recently formed Horticultural Society and Botanical Gardens in Wellington.(28) At the same time, in May 1843, Charles Terry returned with Colonel Thomas to Auckland to manufacture fibre from the flax which Terry had cultivated previously.(29) Slowly some progress was being made, and it was again suggested that, in a very short time, the colony would be in a position "to make a regular export of the article in a very superior state."(30)

(27) Ibid., p. 182-3 (21 January 1843).
(28) Ibid., Vol. 2, p. 244 (6 May 1843).
(29) New Zealand Gazette, 10 May 1843, p. 3.
(30) Nelson Examiner, Vol. 2, p. 246 (13 May 1843).

The next problem to be faced was that of the low price paid for the fibre obtained on the English market in comparison with the high cost of producing it in the colony. Some of the producers brought the high production costs to the notice of the public at a meeting held in Nelson in May 1843, when it was stated that the total cost of producing the fibre to the stage where a shipping agent might export it to England or Australia would be £20 per ton (where they reckoned to produce one ton of fibre from every three tons of green leaf). This high cost was called in question by some, and ways in which the cost could be reduced were considered.(31) Subsequently there was some discussion of the prospects of using Phormium for overseas trade, it being maintained that, at the prices given to the Committee of the House of Lords in 1838 where the maximum paid was £24 per ton, the entrepreneur who shipped the fibre would have to sustain a loss of over £8 per ton. Other correspondents differed, bringing the deficit down to less than one pound for every ton;(32) but this spate of discussion showed how precarious was the trade at the time. Sir George Farmer could write from England, "I am led to believe ... that the consumption will be immense, if the flax can be introduced at a moderate price;"(33) but there were many problems to be solved before it would pay any colonial dresser or shipper to export Phormium fibre. It was said by many manufacturers in England that they

(31) Ibid., p. 250, 251 (20 May 1843).
(32) Ibid., p. 251 (20 May 1843); pp. 254, 255 (27 May 1843); p. 279 (8 June 1843).
(33) Letter dated 14 February 1842, printed in the New Zealand Gazette, 26 April 1843, p. 3.

would not buy much New Zealand fibre because they were not assured of a constant and sufficient supply: on the other hand the New Zealand producers were faced with an erratic market upon which few hopes for a permanent trade could be built.

It had become obvious that it was well nigh impossible for individuals, even if assisted by men like E. J. Wakefield, to develop the trade against the caprice of the English market. Some kind of collective action was necessary. In 1843 Mr. M. J. J. Donlan, who was at the head of a number of companies,(34) applied to the New Zealand Company directors in England for certain concessions to his new company, the National and New Zealand Hemp and Flax Company. There followed advertisements of that company in the New Zealand Journal, stating that the company was to work in the Cook Strait area, collecting flax under supervision and exporting it to England to be processed according to Donlan's patents. The whole scheme seemed to the Gazette to be a fiasco, the paper criticising the company's silence for many months.(35) At first the Gazette had hoped that the solution of the problem of dressing the flax would come from Donlan's process, but it became critical of Donlan's pessimistic attitude towards all other experimenters, especially colonial ones.(36) Mr. Luke Mattrass, who was later to come to New Zealand and try to apply Donlan's methods of preparing the flax, was a strong advocate of the

(34) The National Sail and Waterproof Cloth Company (1838); and the Staffordshire Hemp and Flax Company (1838) formed to take regular and large supplies from New Zealand; but they were not forthcoming.
(35) Ibid., 15 November 1843, p. 2: New Zealand Journal, 4 Feb. 1843.
(36) New Zealand Gazette, 13 March 1844, p. 2 (the Leader).

process invented by Donlan.[37] Later in the same year, September 1843, Donlan again negotiated with the New Zealand Company for privileges in New Zealand. They fairly closely resembled some aspects of his proposal to the Company in 1841.[38] This time, however, he was representing a new company, the New Zealand Flax Importation Company. He requested to be allowed to crop flax from the unsold areas of the Company's lands until such time as they were disposed of to settlers, or to be granted a section in either Wellington or Nelson where his company would be able to establish a factory. In the latter case he requested free emigration to New Zealand, through the New Zealand Company, for those whom he would select to work in his factory. The final alternative was for the New Zealand Company together with a committee of the colonists to direct and advance the interests of the New Zealand flax Importation Company in the colony.[39] As was to be expected the New Zealand Company rejected these proposals. The New Zealand Gazette, in the leader of the issue in which this correspondence appeared, suggested that Mr. Donlan ought to come to New Zealand, hoping that after he had spent a year here he would be a little more conversant with the colonial situation and problems.[40] In the meantime in Nelson there were more favourable reports of Donlan's process, and of his water-proofing preservative

(37) Ibid., 27 January 1844, p. 3; 13 March 1844, p. 3.
(38) M.J.J.Donlan: Observations on New Zealand Flax to the New Zealand Company, 25 November 1841.
(39) New Zealand Gazette, 23 March 1844, p. 3.
(40) Ibid., p. 2.

which was praised.[41]

Much of the criticism which was levelled at Donlan and others in England was well founded. It was obvious that all the reports of mechanical developments and fluctuations in prices would take some time to reach New Zealand, but it was claimed that:

> "Much has been written on the subject there (in England)... We have heard of processes having been discovered and machines invented which would render flax fit for exportation. But to this time the Settlers in Cook's Straits remain ignorant of them, and of that important portion of the subject especially, the price... We would suggest to our English friends, who are experimenting, the advantage which would arise from furnishing a little more practical information."[42]

This was probably the reason behind much of the criticism raised by this same paper against Donlan and those who experimented and set about to form companies to further the use of Phormium tenax.

The importance of Phormium as a possible staple product of New Zealand for export to England was fully realised in the colony. Men were even prepared - as was the case at Evans Bay, Wellington - to scrape the leaf after the native process. It was suggested that a type of "cottage" industry should be carried on until such time as a machine was invented to produce good fibre by mechanical means;[43] and it was reported in November 1844 that two men in the Nelson district had devised a

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(41) Nelson Examiner, Vol. 2, p. 389 (20 January 1844).
(42) New Zealand Gazette, 30 December 1843, p. 2 (the Leader).
(43) Nelson Examiner, Vol. 2, p. 397(3 February 1844). - This reminds one of eighteenth century England with its 'cottage' industries. The writer was told by an old flax-miller that before the 1877 Education Act in New Zealand, the only way for some children to receive any education was to work in the flax mills where teachers were employed to instruct the children of mill hands, and those working there.

simple machine which,

> "will enable a child eight or ten years old to dress as much flax as an adult could by scraping in the Maori fashion; and, as it can be made for a very few shillings, it will be attainable by every cottager."(44)

The factories went ahead, and meetings were held to discuss the samples presented by the mill-owners. Improvements were observed and hopes held of a rapid solution to the problems of efficient stripping an cheap shipping to England. New machines, new factories, new methods of cultivation all were remarked upon with interest by the local newspapers and were quoted by those of other districts.(45) In January 1845 the ma who had strongly advocated the application in New Zealand of Donlan's inventions, Luke Nattrass (who was also referred to by the New Zealand Gazette as a man with keen interest for the advancement of the colony)(46), arrived in Nelson. His arrival was enthusiastically reported by the Nelson Examiner as "an event of considerable importance to the colony."(A company had been formed to put Donlan's theories and inventions to the test in Nelson, to be worked by some fifty men with machinery imported from England. During that year, at the Nelson anniversary celebrations, a prize was given to the most efficient flax-dressing machine worked by one man by manual power; this contest drew several entries and much interest.(48)

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(44) Ibid., Vol. 3, p. 146 (16 November 1844).
(45) New Zealand Gazette, 30 Sept. 1843, p. 3; 11 Nov. 1843, p. 2; 9 Dec 1843, p. 4; 9 Nov. 1844, p. 3; 14 Oct. 1843, p. 3; 10 July 1844, p. 2. Nelson Examiner, Vol. 3, p. 58 (17 June 1844); p. 62 (22 July 1844). Southern Cross, 3 August 1844.
(46) New Zealand Gazette, 13 March 1844, p. 3.
(47) Nelson Examiner, Vol. 3, p. 186 (25 January 1845).
(48) Ibid., p. 196 (8 February 1845).

In 1845 the Belfast Flax Improvement Society reported on specimens of Phormium tenax which it had examined, and, while praising its strength, it insisted that it would have to be better cleaned, and more cheaply produced to find a ready market in England.(49) In the same year it was rumoured that some Phormium fibre had been dressed in such a fashion that it had entered Belgium under the guise of European hemp from a London sale.(50) Further, in 1846 a French inventor approached the New Zealand Company, seeking to make a contract with them for one thousand tons of flax (per annum) as worked by the Maoris, at the rate of £5 to £6 per ton, to be shipped to Paris where he would work it by his own process. This was referred to Captain Wakefield in New Zealand, and publicised in Wellington.(51) At such prices the continuation of interest in Phormium seemed impossible, but there were those who believed that success was not far away. Mr. Mattrass, with the assistance of a number of Maoris, was producing fibre which brought forth commendatory comment in a leader in the Nelson Examiner.(52) And although from 1846 until 1849 there was little reference to the work which was being done with Phormium, many men persevered.

One of the chief problems to be solved in the dressing of Phormium fibre dealt with the glutinous mucilage which seemingly refused to be removed from the fibre; the presence of this substance was blamed for

(49) Ibid., Vol. 4, p. 92 (2 August 1845).
(50) New Zealand Spectator, 19 April 1845, p. 3.
(51) New Zealand Spectator, 24 June 1846, p. 3. - The paper commented that while the price offered was too low, it could be an overture upon which profitable negotiations might be based.
(52) Nelson Examiner, Vol. 5, p. 46 (23 May 1846).

the brittleness of the fibre as received in England. Some sign of the advances which were slowly being made with Phormium was shown, therefore, when, in July 1949, it was reported that a man at Wanganui, Henderson, claimed to have solved the problem; and, before thirteen of Wellington's leading men, including Dr. Featherson and Messrs. William Fox, H. S. Chapman, and N. Levin, the new process, using alum to dissolve the mucilage, was demonstrated. The paper concluded:

> "New Zealand need not envy South Australia her copper mines, nor California her gold fields. Her flax will prove a source of inexhaustible wealth, giving profitable employment to all classes, to both Native and European, and will render this colony independent of all extraneous support,"
> (53)

- if the new process was a success. A few months later, November 1849, at a public meeting in Wellington, presided over by William Fox, the Wellington New Zealand Flax Company reviewed the steps taken by persevering men to form the company, whose chief purpose was to manufacture paper from Phormium tenax. By the meeting it was resolved that three men should investigate what machinery would be required, and obtain estimates; £300 was to be floated by public subscriptions to commence operations; and the affairs of the Company were to be in the hands of a committee of five. The newspaper urged all settlers to subscribe who could possibly do so, pointing out that unless the colony could produce some manufacture so greatly needed by Great Britain all the fond hopes of the colonists would quickly vanish. (54)

(53) Ibid., Vol. 8, p. 97 (18 Aug. 1849); Wellington Independent, 25 July 1849, p. 3.

(54) Wellington Independent, 24 November 1849, p. 3; New Zealand Spectator, 24 November 1849, p. 2; Nelson Examiner, Vol. 8, p. 161 (8 December 1849).

Hope seemed to be rekindled for the realisation of what was now becoming an old ambition - to be able to use the native plant Phormium tenax to commercial advantage to the colony. Writing in 1849, F. G. Moore, a settler, estimated that the chief need was sufficient capital to commence a big undertaking which could stand the financial strain of experimentation, and that the second requirement was the importation of the requisite machinery - flax-dressing machines, looms, rope-making machinery, and paper-mills. He confidently claimed:

> "There is no portion of the flax need be wasted; the finest sorts will make cambric and linen; the next drills, duck, and canvass; the next rope and twines, bagging and sacking, woolpacks and bands for them; what otherwise would not pay for its freight home will make excellent paper, fine and coarse .... The demand for these manufactures is daily increasing in New Zealand, whilst in New Holland there is a ready market for upwards of £150,000 worth annually ..."(55)

Moore asserted that the cry in Sydney, where New Zealand wool-bands were in high demand, was "Why do you not send more? The reason (he wrote) is we have no looms." Immense benefit, he said, would be gained by the Maoris from occupation in the regular and remunerative work of the flax industry. It would develop the Maori's appreciation of the Pakeha and his civilisation, while at the same time rewarding him materially. Moore affirmed that only in this way could anyone hope to 'ween' the Maori from his warlike native pursuits.

Colonial trade in Phormium fibre did increase in 1850 with a number

(55) F. G. Moore: "The Importance of the Native Flax ..." found in C. J. Hursthouse: A Lecture on New Zealand ..., p. 51-54.

of partial successes by different experimenters throughout New Zealand. There can be no doubt that there was the sincere desire to see this raw material rendered useful to the community. In 1850 it was noticed that, as F. G. Moore had stated, the Australian demand for Phormium products was increasing. It was reported that manilla hemp was so dear that the Sydney merchants refused to import it; naturally this was seen as a great opportunity for the colony to prove the worth of its fibrous product.(56) Added to this was the encouragement received to the colony when Mr. Nattrass succeeded in producing the dressed fibre at a cheaper rate, and when it was observed that the Maoris were once more taking a keener interest in the trade and were bringing to Wellington and the coast dressed fibre to sell to the shipping merchants.(57) Another rope-walk in Nelson, owned by Mr. Beecham, was reported to be producing very fine articles, equal to those made in Europe, and sturdy ropes for ships in port.(58) Once more there appeared in the paper an advertisement for all kinds of ropes from ships' cables and whale lines to clothes lines, as well as ropes made to order. Auckland ropes were said to have been tested and praised in English dockyards, and were being used on a sloop in Auckland.(59)

Shipments of Phormium fibre were still being shipped to England

(56) New Zealand Spectator, 22 June 1850, p. 2 (the Leader).
(57) Nelson Examiner, (23 March 1850) Vol. 9, p. 15. - Later the paper expressed doubts as to the possibility of Mr. Nattrass producing the fibre as cheaply as he had suggested he could. Ibid., p. 138 (26 Oct. 1850).
(58) Ibid., p. 54 (1 June 1850).
(59) Ibid., pp. 105, 106 (30 August 1850).

despite the poor prices realised on the English market. There remained a strong prejudice there against the New Zealand fibre. It was reported by some, who tried the Phormium product and found it to answer well for some purposes, that merchants who dealt in Russian hemp were always very derogatory in their comments upon the former material. Certainly, as a Glasgow manufacturer stated, the flax fibre was harsher and would have a limited range of uses until such time as it could be thoroughly dressed; but he also expressed his willingness to accept "an occasional shipment of ten tons of the same quality in similar condition" at £25 per ton.(60)

Again the promising revival of the trade was not as widespread nor as permanent as many had hoped it would be. Men, however, kept trying to devise an efficient mode of preparation for the fibre. Various ways of dressing the flax had been used - soaking, scraping, even using steam(61) - but in 1852 in England the Chevalier Claussen, whose name was said to be "as indissolubly connected with flax as that of Arkwright or Watt with cotton or the steam engine", announced the success of steeping the leaf first in an alkaline, and then in an acid solution, whereby the fibres of Phormium were completely freed from the mucilage and reduced "to the pulpy fabric of cotton". He was said to be erecting a large

(60) Letter to a Nelson miller. - Ibid., Vol. 9, p. 158 (30 Nov. 1850).
(61) Robert Williams had tried the soaking in 1813; most processes in New Zealand involved scraping; steam was tried in 1843 (New Zealand Gazette, 23 December 1843, p. 3).

factory in London to implement his new process.[62] But this seemed to be only another method investigated, tested, and rated among many such 'mediocre' modes of manufacture.

Foreign affairs occupied the pages of the newspapers from 1853 to 1860 with the Crimean situation, and later with the Italian struggle; as well as constant references to the gold-fields of California, and Australia's new-found wealth, both mineral and pastoral. The Crimean tension and war, in which Britain upheld Turkey against the Russians, was expected to have its effects on Britain's attitude to New Zealand's fibrous raw material, Phormium tenax. The Manchester Guardian was quoted in New Zealand for its comments upon Mr. Cobden's speech in the English Parliament. The English fleet had sent a squadron to guard the Baltic against the escape of any of Russia's merchant or naval fleet. Cobden warned the House of Commons that while this blockade did not affect British exports to any noticeable extent, they should be careful not to jeopardise the importation of essential naval stores - both flax and timber - without which England could scarcely carry on the war.[63] But although it might have been thought that the Crimean War would have led, almost immediately, to an increased demand for Phormium fibre, such was not the case. The Manchester Guardian, commenting on Cobden's statement, assured readers that the loss of the articles mentioned by the Honourable

(62) Wellington Independent, 30 March 1852, p. 3. - On later investigation this method has been found to damage the fibres.
(63) From Manchester Guardian - Nelson Examiner, 23 Dec. 1854, p. 3.

Member had not been noticed by manufacturers once the initial speculation had died down; but that Russia was being put to great expense to export her goods over land.

In 1855 Mr. Nattrass at Nelson received a letter from a London firm to whom he had sent samples of fibre dressed by his improved methods. This letter he published in the newspaper. The London firm seemed impressed by the improvement in the quality of the fibre and suggested to Nattrass that he could ship twenty to forty tons in every vessel with the assurance of realising £10 to £14 a ton on account, and for the better sort, £18 to £20 .... I am certain (he wrote) that if once a regular trade is established, and pains taken to send it in a good sound state, very great results may ensue, and your profits will be considerable."(64) This would seem to indicate an increase of interest in England which was possibly the result of the war being unexpectedly prolonged. Certainly the Court seemed to be acquainted with the qualities of Phormium ropes as compared with Russian ones according to the account of the Anglican missionary, Rev. Richard Taylor, who visited the Court in 1855 with a Maori chief.(65)

Whatever the impressions in England, in New Zealand both the Provincial Council for Nelson, and the General Assembly of the New Zealand

(64) Nelson Examiner, 14 February 1855, p. 3.
(65) Rev. R. Taylor: Te Ika A Maui, p. 474. - Taylor's account of an interview at Court with the Queen, the Prince Consort, and Sir William Molesworth, on 4 September 1855.

Government showed their increasing interests in the prospects of using Phormium tenax. In March 1856, in the Nelson Provincial Council it was moved

> "... that his Honor the Superintendent requested to place upon the Estimates the sum of £50, as a bonus for the discovery of a new and effective method of preparing the New Zealand flax, so as to create, if possible, an immediate export trade from this province."(66)

The mover of the motion spoke of the source of great benefit and wealth to the province and to the whole country Phormium would be if a really efficient means of preparing it for the overseas market were discovered. He, therefore, concluded that it was the duty of the Provincial Government to "foster and encourage" the efforts of the enterprising and persevering experimenters who were engaged in this quest,"by offering a moderate reward for the discovery." The motion was debated and was lost, it being held by many that the Province did not possess the £50 to 'throw away' in this manner.

Later in the year, on 11 August 1856, in the General Assembly of the Government at Auckland, a similar motion came forward. The House was to ask His Excellency, Governor Gore Browne, to offer a Government reward to any person who could prove that he had discovered and invented an efficient means of preparing Phormium tenax, or any other fibrous plant indigenous to New Zealand, "at such a cost as will render it an

(66) Nelson Examiner, 2 April 1856, p. 2. - The motion was moved by Mr. Hough.

article of general export". The Government would undertake to make provision for such reasonable rewards. On this occasion the motion was carried.(67) Accordingly, on 20 December 1856, there was issued from the Colonial Secretary's Office, Auckland, notice of rewards amounting to £4,000 to be given under prescribed conditions to those who could prove their inventions to the satisfaction of the Government. The conditions were:-

> "£2,000 - To the person who shall, by some process of his own invention, first produce from the Phormium tenax, or other fibrous plant indigenous to New Zealand, one hundred tons of merchandise.
>
> "£1,000 - To any person, other than the person entitled to the first reward, who shall, by some process of his own invention, next produce from the Phormium tenax, or other fibrous plant indigenous to New Zealand, one hundred tons of merchandise.
>
> "£1,000 - VIZ.: - £200 to each of the first five persons, other than those entitled to the first and second rewards, who shall by any process, whether of his own invention or not, produce from Phormium tenax, or other fibrous plant indigenous to New Zealand, twenty-five tons of merchandise."(68)

In that same year, Edward Shortland, in his book Traditions and Superstitions of the New Zealanders, urged the colonists of New Zealand to strive with all their might to discover the process whereby Phormium might be brought into the European market with profit, at a time when the Russian supply, he said, was interrupted and the fibre merchants of England

(67) Ibid., 11 October 1856, p. 3; New Zealand Parliamentary Debates, 1856-1858, p. 350. - The motion was moved by Mr. Williamson. Mr. Daldy, who seconded the motion, re-introduced the subject in the next session, 16 August 1858 (ibid., 1858-1860, p. 147). It was suggested by another speaker that a Bill to protect any invention of a flax machine should be introduced in the next session (1860); but nothing was done, the Native situation occupying the attention of the House.

(68) Nelson Examiner, 24 January 1857, p. 3.

and other countries would be looking for some alternative. Shortland felt sure that if a new and satisfactory process were found Phormium would be well received.(69) In the following year, 1857, James Busby, the former British Resident to New Zealand, made a similar claim in a lecture delivered in Auckland. He told of his amazement when he had visited Scotland years before and had found that Scottish fibre concerns were financing Russian fibre sources.(70) He nevertheless was of the opinion that Phormium now had its chance of proving to be what so many had for years hoped it would become, the staple of New Zealand. Busby could see no other commodity which New Zealand could produce as of more importance and value than Phormium: "but at the same time I felt persuaded that it was an enterprise which the colonists must work out for themselves", he concluded.(71)

In a Supplement to the Nelson Examiner, in June 1858, among the items of the English news brought by recent vessels to Nelson, there was a sentence regarding a new process for dressing the flax, using steam. This was heralded as a new and inexpensive invention; but on the following week there appeared a letter stating that for three years this method had been used with considerable success in a factory within ten miles of Nelson:(72) it also seemed to be forgotten that a steam process was used in 1843. Nevertheless this did indicate that in England men were still

(69) E. Shortland: Traditions and Superstitions of the New Zealanders, p. 205.
(70) This was affirmed by Donlan also in Phormium tenax or Neptune New-Rigged, p. 32.
(71) J. Busby: Colonies and Colonisation, p. 14-17 - a lecture in Auckland.
(72) Nelson Examiner, 2 June 1858 (Supplement); 9 June 1858, p. 3.

trying to devise some means of making Phormium fibre fit for the English manufacturers. This was the case; for in August 1858 there was reported a meeting in the Taranaki Institute rooms where specimens of the products of the process used by the London flax-millers, Pye and Company, were displayed. They were said to compare very favourably with other fibres, and to be superior to native-dressed material. Once again the newspaper expressed the hope that this might be the beginning of the realisation of the old desire for using Phormium. The Company informed the meeting that the cost of the machinery, plant, and factory, in New Zealand, would be about £1,000. A number of men were elected on to a committee "to make additional enquiries, and originate some scheme for rendering the flax available as an article of exportation."(73)

In the following month, September, the committee reported that they considered there were two steps to be taken - facilitate cultivation, and import machinery "as soon as practicable". They found Pye's machinery satisfactory, capable of crushing three tons of flax daily.(74) They further reported that some eight hundred acres were under flax cultivation in the Auckland district. The country seemed to be awaking to the possibility of using even the imperfectly dressed fibre that was being shipped overseas at that time.

In March 1859 a medical practitioner, Richard Kingdon, M.D.,

(73) Taranaki News, 16 August 1858; Nelson Examiner, 18 Sept. 1858, p. 3.
(74) Taranaki Herald, 11 September 1858, p. 2 (the Leader). - It is interesting to note that Pye's process is described as "crushing" the leaf. This is the modern method of stripping the Phormium leaf, after which it is thoroughly washed.

brought to the notice of the public of Taranaki a proposal to set up a company in New Zealand and extend it to England so that interests in both countries could be correlated and coalesced with more hope of success than previous schemes. He advocated floating a company of £1,000 or £2,000 in New Zealand with shares of £25, and raising the remainder of the capital necessary to commence a fibre business in both countries among interested people in England. He suggested calling a meeting in New Plymouth with a view to forming this company. Whether or not it was formed immediately in New Zealand, Kingdon expressed his intention of proceeding that year to England to arouse interest in his designs there; he offered to act as Agent to a company formed in New Zealand along the lines he was suggesting.(75) No further reports are to be found on this scheme of his, but it seems, like many others, to have lapsed without more publicity. This was not to be wondered at; one only had to think upon the number of times similar ideas had been expressed in the newspapers of the country to realise that most of the readers, who, by this time, were deeply engrossed in pastoral occupations, and who were beginning to obtain respectable returns for their produce, would look on these reports with but passing interest. Further, the Native troubles of the North Island and the commencement of the Taranaki War were commanding attention.

Nelson does seem to have been one of the chief centres of enthus-

(75) Nelson Examiner, 19 March 1859, p. 3, - from the Taranaki Herald.

iasm and persistent endeavour over Phormium tenax. Six months after Dr. Kingdon's proposal, a man called Tucker was appealing to the New Zealand settlers to open their eyes to the possibilities of yet making something worthwhile out of Phormium fibre. He deplored the mania for the gold and coal fields, and the blindness to the real staple of the country, Phormium. He was, of course, trying to interest the 'Nelsonians' in the newly-formed National Flax Company Limited, with a capital of £200,000 formed to take large supplies of flax into the United Kingdom and to look for world-wide markets, basing many of its hopes on the remarkable decline in the importation of foreign fibres into England. One true note Tucker did strike: he maintained that in spite of the considerable Government rewards, the task was too great and too hazardous for any individual to undertake, and that only with Government co-operation and assistance, - and a large company such as the one for which he was agent - could New Zealand Phormium be exploited as it ought to be.(76)

This formed that last great appeal to those, who, in twenty years, had settled the country of New Zealand, to regard Phormium tenax with its hard, strong fibre as the staple of New Zealand commerce. James Busby had been mistaken when he claimed that New Zealand could never find another commodity so valuable as that of the indigenous fibrous plant, Phormium tenax. By 1860 the colony of New Zealand had

(76) Nelson Examiner, 12 October 1859, p. 2.

found that this country was eminently suitable for many primary products, not least wool; and by 1860 the prices for New Zealand wool on the London market appeared quite satisfactory and even encouraging to the farmer. Like reports on Phormium fibre sold in England, the early reports of lots of New Zealand wool at London sales were critical of the classing and the poor way the wool was "got up" for the sales, but these had been displaced. What, then, of the trade in Phormium?

The vicissitudes of the Phormium fibre industry during the first twenty years of organised colonisation in this country were many; but, graphically, one could perceive a slow and steady rise despite the many failures. Nor was this degree of success and achievement something which could be realised only later on a close examination of the history of those years. The Nelson Examiner, in quoting the precent prices in London, added the comment in May 1860,

> "It is with great pleasure we notice that this article has at last found a place in the London market." (77)

That, it must be asserted, was the most fitting tribute to the strivings of those who had worked ceaselessly for twenty years to produce fibre which could make for itself an established and accepted place in England. The price had not risen greatly, it being reported that £18 to £20 was the price paid for Phormium fibre in 1860; (78) but there had been a lowering of the cost of producing the fibre, and of shipping (due to

(77) Nelson Examiner, 19 May 1860, p. 2.
(78) Ibid., 25 August 1860, p. 2.

the use of better presses).

Just as it must not be thought that, because Phormium tenax could no longer be regarded as the basic article of commerce for New Zealand, it was of no further importance; so it would be wrong to think that, because progress had been made, there were no more problems to be solved. In the final twelve years of this study, as in the twenty which have just been considered, there were many problems of production to be faced; but in the next twelve years, to 1872, there was to be a widening of interest as it was realised that Phormium could be used for wool-packs in New Zealand, and as men discarded the idea that it could be used for fine fabrics. In the years 1839-1860 many men had tried to form companies for using Phormium. While in the years 1861-1872 this continued, there was also growing up the tendency to found associations and societies for a scientific investigation of Phormium tenax. It has been noted in this chapter that the Governments of New Zealand, both general and local, showed an interest in Phormium in the later 'fifties. This interest, along with that throughout the country, grew in the 'sixties.

C H A P T E R VI.

RENEWED ENDEAVOURS, 1861-1872

In the decade of the eighteen-sixties there may be said to have been two avenues of activity with Phormium tenax, the one being related to the now common quest for the most efficient and economical method of processing the leaf to obtain the fibre, while the other, and perhaps more remote, interest was associated with Government orders and offers of rewards for success in the former sphere. These represent the unofficial and the official strands which, towards the end of the period, were brought together in the nation-wide flood of activity, individual and corporate, local and general, unofficial and official, with which this consideration of Phormium tenax in New Zealand History closes. One of the most striking features of the interest taken in Phormium in the 'sixties was its widespread nature, despite the pressure of other important local national and international questions. From the earliest days of 1861 the newspapers devoted pages to the proceedings of the Provincial Councils and the development of the provinces, to the proceedings of the General Government, and especially to the Maori Wars, first in Taranaki and later in the Waikato and East Coast; and many and long were the articles and letters written about the Italian situation, the American Civil War, and, in 1870, the Franco-Prussian War.

Nevertheless, throughout the same years as these stirring events took place, Phormium as an article of importance to the Provinces individually, and to the country as a whole, received an increasing amount of publicity. There were still considerable periods of 'silence' when one seemed not to hear anything of Phormium, when reports from the race meetings and the gold-fields, and articles on the diseases harassing the pastoral industry were in prominence; but the activity of interested persons throughout New Zealand was continuous, as the articles, reports, and public correspondence about Phormium showed.

Experimentation continued as before, only with increased impetus and on a much broader scale. It is not surprising, therefore, that early in 1861 the Nelson Examiner reported that Mr. A. McDonald, after several years of patient work, had perfected his flax-dressing machine, and would apply for the Government reward of £2,000 for producing sufficient fibre at an economical cost and of marketable quality.(1) This was followed shortly afterwards by a statement on the new machine invented by Messrs. Purchas and Ninnis of Auckland, including the text of the recently passed "Purchas and Ninnis Flax Patent Act", which was to protect their invention.(2) In these two reports the 'theme' or tenet of activity for most of the decade was revealed; for McDonald's "perfection" of his machine and Purchas and Ninnis' application for a patent to

(1) Nelson Examiner, 13 February 1861, p. 4.
(2) Ibid., 18 May 1861, p. 3.

cover their invention were the forerunners of much subsequent action. The intensity and ubiquity of efforts to obtain a satisfactory stripping machine for Phormium in part occasioned the appointment of the Flax Commission in 1869 by the General Government of New Zealand "to enquire and report upon the machinery employed in various portions of the Colony for the preparation of New Zealand Flax..." (3) And the increasing number of applications for patents for various machines and methods for dressing the Phormium fibre evoked a letter to the press requesting that the granting of patents be withheld in order that the whole country might benefit from the pooling of the inventive genius of all the experimenters at work. (4)

For what purposes, however, was Phormium tenax to be used; and for what articles was its fibre suited? Already it has been noted that this question was reiterated throughout the century, and each time there seemed to be a different response. In the last twelve years with which this study is concerned, the answers to this same question were as varied as before. Quoting an article from an English newspaper on the forthcoming 1862 International Exhibition of Colonial Timbers and Fibres, the Wellington Independent claimed popular acceptance for the assertion that Phormium was ideal material from which to make paper; (5) but unfortunately

(3) New Zealand Parliamentary Debates, 1869, Vol. 10, p. 202 ff. - part of the text of the resolution passed by the House.

(4) Wellington Independent, 30 September 1869, p. 3 - a letter written under the nom-de-plume, "Pro Bono Publico" - (From this point, references to newspapers will be confined to the Wellington Independent and Otago Witness for the sake of simplicity. All the main provincial papers repeated the same articles and British letters on, or about, the same date. There was constant, acknowledged borrowing of news among them.)

(5) Wellington Independent, 24 September 1861, p. 2.

such acceptance seemed not to be so clear to others who flatly denied the excellence - and indeed the usefulness - of Phormium for paper-making.[6] Others were to advocate the New Zealand fibre for fine fabrics and even for clothing materials;[7] But again many persons most intimately connected with the fibre trade, whether as dressers, brokers, or manufacturers, constantly maintained that Phormium would only be fit for the coarsest of cloths, such as wool packs, corn sacks, and perhaps sails, and for cordage. Such divergent opinions must be noted throughout this chapter.

Of one thing, if of no other, all New Zealand experimenters were sure: if once they could master the art of dressing the Phormium leaf, extracting from it its white fibre, unharmed, but completely free from all foreign matter (such as the gummy mucilage), the importance of such mastery to the whole Colony could not be over-estimated. When the factory of William Bentham and Company, on the Hutt River, was destroyed by fire in 1861, and a public appeal was made by the Company to set them up in business again - their factory was not insured - the paper averred:

> "The public need not be told that the enterprise is one which... must ... produce an incalculable indirect benefit to the whole community... On this national ground alone are we justified in bringing Messrs. Bentham's claims before the public... the duty of the Press is to urge renewed effort whenever there appear reasonable grounds for expecting success."[8]

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(6) Otago Witness, 8 August 1868, p. 14 - "The legitimate use of this article... is that of spinning..."

(7) Canterbury Flax Association: The Utilisation of Phormium tenax, p. 72; and Wellington Independent, 20 August 1870, p. 4 - A hat and coat were exhibited, made in England from Phormium fibre.

(8) Ibid., 26 October 1861, p. 2-3. The paper recommended that the Chamber of Commerce take up the Company's plea for aid.

Although there were always those who were prepared to try to use their experiments to their own advantage, fortunately others appeared who seemed willing to seek the great good, and ultimate prosperity of the country through their endeavours. Such a man was Mr. M. Whytlaw, who, in October 1861, - because of the passing of the Patents Act of 1860 by which it was possible for anyone to copy his ideas and patent them, thereby closing them to public benefit - published a short pamphlet on the processes which he had employed for many years with considerable success for dressing Phormium tenax. Perhaps because of the weight of years and his full share of misfortune, Whytlaw spent considerable portions of the pamphlet in reminiscence; but his desire to assist the fibre industry for the good of the country was obvious. His concluding paragraph contained a genuine and forthright appeal to the reader to realise the great importance of his subject:

> "It is to be hoped that the settlers in New Zealand, especially in this Northern portion of it, will not rest satisfied with merely growing wheat, corn, and potatoes, or even wool. This colony is comparatively limited in its extent of land available for such purposes, and the wool growers at the south are already treading on each other's toes for want of space to stretch out. Whereas if the valuable indigenous production of our soil ... were carefully cultivated, large tracts of land, otherwise useless, would become valuable ... I have thrown in my mite for the general good ... and I trust that others ... may ultimately reap abundant advantages."(9)

(9) M. Whytlaw: New Zealand Flax: Its Culture and Preparation, p. 16. The Wellington Independent praised the author's public-spiritedness, and reprinted the whole pamphlet in its columns (10 December 1861, p. 2; and 13 December 1861, p. 3-4 respectively).

Nor was the Government ignorant of the importance of discovering some satisfactory means of utilising Phormium for trade. On 13 September 1861 the rewards amounting to £4,000 were announced through the provincial newspapers:(10) these rewards were to be sustained and the time of their application extended until 1866. Three men were appointed to consider all claims to the rewards, half of which would be paid when they certified their satisfaction with the process, the remainder to be paid after successful marketing of the fibre in England. The Commissioners were the Hon. Reader Gibson Wood; C. J. Taylor, Esq.; and Charles Knight, Esq.(11) In spite of these offers, and the possibilities of new discoveries opened up by Whytlaw's revealed method of treating the leaf laterally instead of longitudinally, and also reports that at Ballarat in Australia Phormium was being used, and that the British market at Birmingham had improved considerably, the Wellington paper was forced to confess that the public seemed to have wearied for the meantime of such information regarding Phormium.(12)

Experiments continued in the various corners of New Zealand, and the reports from the International Exhibition proved so encouraging that there again appeared a quickening of interest and the 'prophecy' that the plants which were being destroyed by farmers would soon be required by them to be replanted to carry on what must eventually and

(10) Wellington Independent, 8 November 1861, p. 4, and 22 November, 1861, p. 6; also Otago Witness, 14 February 1863, p. 4 (Leader).
(11) Otago Witness, 21 March 1863, p. 5.
(12) Wellington Independent, 10 January 1862, p. 3; 21 January 1862, p. 3; 9 December 1862, p. 3.

inevitably be one of the main industries of the country.[13] Some were encouraged by the growing likelihood of turning Phormium to account within the colony with the rise of the pastoral industry to a position of economic predominance; but, although that was not to come for some years, there was the immediate opportunity of establishing markets for Phormium while the American Civil War made supplies of cotton to the English looms inadequate for their requirements, and while "manufacturers (were driven) to their wits' end to find materials for keeping their looms going."[14] Further, from samples of the fibre sent to Great Britain in 1862 there came back favourable reports, praising the fibre as eminently suitable for heavy fabrics "such as sail cauves, and tarpaulin cloth, for which there is now a most extensive demand for the American market" owing to the extremely high prices realised by Baltic and continental fibres.[15]

Encouraged by these goodly prospects the colonists' interest revived. Many efforts were made to determine the most economical and efficient way of harvesting the leaf. It was suggested that only the mature outside leaves of each "fan" of flax should be cut, leaving the inner ones to grow to maturity for the following year's harvest.[16] Renewed endeavours were expended on the theory that Phormium could best

(13) Ibid., 11 December 1862, p. 2; 14 February 1863, p. 2.
(14) Otago Witness, 14 February 1863, p. 4.
(15) Ibid., 2 May 1863, p. 5.
(16) Ibid., 14 November 1863, p. 5. - This method, known as "side leafing", has since been condemned as very much more wasteful than the total cutting which was criticised by those recommending the "side leafing" method of harvesting.

be employed in the paper industry, and some hopeful spirits in Canterbury conceived of New Zealand as the "great paper producing settlement of the Southern seas"; but that was not to be either.(17) All these prospective large-scale and efficient industries - whatever their similarities, and their differences - illustrated the same conclusion that "the difficulty is not in preparing the fibre, but in producing it at a sufficiently cheap cost to leave a profit on its sale."(18) Always, the schemes of experimenters in New Zealand, while in themselves feasible, when brought into their economic relationship with the commercial life of New Zealand and of the world, seemed alike to be hopelessly inadequate. Nevertheless there were those in England too, who considered that one might profitably 'prospect' with Phormium tenax. In 1863 there appeared the prospectus of a 'New Zealand Flax, Hemp and Cordage Company' formed in London with a capital of £15,000, whose aim was "the manufacture in New Zealand of fibrous merchandise similar to hemp and flax, and of cordage from the Phormium tenax, a valuable fibrous plant indigenous to and abounding in the Colony". This company claimed that it would eventually gain the Government's prizes of £4,000 which it would invest in the Company as capital. Unfortunately, though not unexpectedly perhaps, nothing more of the proposed Company was heard.(19)

In the years 1863-1864, in Dunedin, Dr. James Hector and Mr. Skey

(17) Wellington Independent, 12 November, 1863, p. 5.
(18) Otago Witness, 17 September 1864, p. 19.
(19) Ibid., 29 August 1863, p. 5.

carried out fairly extensive experiments with a variety of chemicals, in an effort to obtain some simple, efficient and economical process of dressing the Phormium fibre without having to invest in expensive machinery, difficult to make or acquire in New Zealand. Their findings were eventually included in Appendix II of the 1870 Flax Commissioners' Report to the House of Representatives. Acids rendered the inter-fibrous material soluble, but left the fibre harsh, or damaged it. A strong alkali such as caustic soda, while neutralising the acidic content of the unwanted matter of the Phormium leaf, damaged the fibre, leaving it a brownish colour "which can scarcely be looked upon as other than a sign of decomposition". Oil and alcohol were useless; but soap was found to "have all the advantages obtained by the use of alkalies without their disadvantages". The difficulty here, however, was that the price of soap made its use expensive in the extreme; it was ruled out as an unpractical commercial method of dressing the fibre. The only possible chemical process which these men would consider from their experiments was a modified form of retting, which, so far as chemical methods were concerned, was the only one which they thought would have any prospect of success.(20) Towards the commercial production of Phormium fibre, these experiments, and others like them in different parts of New Zealand, contributed only in a negative way; yet such results all added some-

(20) Appendices to Journals of the House of Representatives, 1870, D. 14, Appendix 2, p. 21-22.

thing to the knowledge men had of this plant which so persistently seemed to resist all efforts to utilise it for the welfare of men. Until the end of the period, until 1870-1872, however, few men took much notice of the findings of others, but persisted in their own experiments: this may account to some degree for the large number of failures recorded.

In 1865 at Port Chalmers there was witnessed what was the prototype of a number of ventures in the 'sixties which could be listed as commercial fiascos. The Port Chalmers scheme included a combination of the forces and interests of Donaldson of the Canterbury firm of Cameron, Donaldson, and Cameron - who received frequent laudatory publicity from the local papers for their progressive developments, - the capital of Otago provincial interests, and the support of the local inhabitants. The Port was having a 'slack' period, and it was hoped that the new concern would bring back life and vigour into the town. At the meetings held to launch the enterprise, many persuasive speeches (including one by Donaldson) were made, and the auspices appeared most favourable; but unfortunately for the enthusiasm of the inhabitants, the capital of the financiers, and the reputation in Otago of Mr. Donaldson, the whole scheme failed abysmally. The paper seemed to lay most of the blame at the feet of Donaldson, and concluded,

> "In the meantime, flax is a tabooed subject in Port Chalmers, and the numerous specimens which were eagerly acquired by subscribers, as well as the list of names, have been suddenly put beyond the rude gaze of the vulgar crowd." (21)

(21) Otago Witness, 5 August 1865, p. 5.

Nevertheless, despite all failures and much financial embarrassment, many men were not to be deterred, and the newspapers still supported them from that sense of duty to a national cause already referred to. In March 1866 the Auckland Southern Cross published an account of a new and simple process used by a Tauranga man, F. McMillan, employing "the droppings of bovine animals". Both this paper and the New Zealand Herald advocated that the public should subscribe for the proper and extensive testing of this method as they had done so generously for the Purchas-Ninnis patent; and in the following month the Otago Witness praised McMillan's patriotism in allowing his discovery to be known publicly, thus following the plaudits with which the Wellington paper (22) had greeted M. Whytlaw's pamphlet. That same paper, however, not realising perhaps that its criticism of its northern counterparts was applicable to itself, brought a sober reminder to its readers that this was not the first time the press had headed its comments, "Flax Question Solved", noting that

> "We must confess that it is with a feeling of humiliation ... that we have perceived the sudden jump to conclusions, which a few empirical trials on the part of a man ... has been able to bring about from the editorial pens of our Auckland contemporaries ..." (23)

It so happened that the use of cow-dung - being in fact the use of the alkali, ammonia - while moderately satisfactory in itself, left much to

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(22) Southern Cross, 22 March 1866; Wellington Independent, 29 March 1866, p. 5, and 10 April 1866, p. 6; Otago Witness, 7 April 1866, p. 12, and 28 April 1866, p. 9.

(23) Wellington Independent, 26 May 1866, p. 5.

be desired when one had the most difficult task of rubbing the loosened matter from the fibre by hand.

All attempts were not failures, however, and indeed some men seemed to produce quite good quality dressed fibre for the English market. From time to time in the "Local-and-General News" columns of the papers there were references to sales and the reasonable prices which Phormium of the better sorts realised. Letters from New Zealanders in England, or from brokers and manufacturers to friends or firms in this country constantly affirmed the moderate interest of many English manufacturers. Many merchants, however, seemed also to miscalculate the possible uses of Phormium fibre, it being stated by some in London that it could"be worked up in all kinds of ways, even among silk".(24) These misconceptions about Phormium did not help its market value; but there were fairly ready sales for good fibre to rope-makers. Thomas Kelly, a member of the House of Representatives, and one of the most authoritative writers on Phormium tenax in the period, - he eventually was a member of the Flax Commission set up in 1869 - wrote in 1866 that, with greater care over all aspects of the fibre industry - selection of varieties, mode of preparation, thoroughness of drying, packing, and sorting - "this plant would furnish New Zealand with one of the most valuable exports ever possessed by any country".(25) There can be little doubt that the haphazard beginning of the trade left in the minds of British manufacturers a

(24) Ibid., 10 November 1866, p. 3.
(25) T. Kelly: Soil, Climate and Capabilities of Taranaki, p. 12.

prejudicial mark which it was most difficult for the colonial producer to erase; so difficult, in fact, was it to overcome this prejudice, that in 1867 in the south of New Zealand a fresh and growing interest was taken in the prospects of cultivating the linen flax plant (Linum usitatissimum)[26] with its fibre-bearing stalk and oil-bearing seed. In the meantime, in Auckland, the Flax Hackling Society was formed and reported to be "steadily progressing ... despite the bad times". This society aimed at producing a more uniform and better quality article for the overseas market.[27] Other corporations like it, in varying forms, also appeared during the decade, most notable the Canterbury Flax Association in 1870.

Perhaps it was not without some justification that the Wellington Independent displayed its scepticism of the new modes of flax-dressing which were frequently described with bewildering detail in the newspapers throughout the country - and in its own columns. It would seem that, even if some inventors were successful in realising a small profit from the produce which they managed to forward to the fibre market, the haphazard experimentalism of the majority of persons interested in Phormium fibre had led the country but little way to the final dénouement of the problem. It was thought by more people than the staff of the Wellington paper, that something more than this empirical, and apparently

(26) Otago Witness, 11 May 1867, p. 12; and 13 July 1867, p. 13.
(27) Wellington Independent, 10 September 1867, p. 4.

blind, interest of mechanics and traders had to be taken. To the various provincial Philosophical Institutes affiliated with the New Zealand Institute, during the years 1868-1872 there were a number of quite scholarly papers presented. These lectures ranged from the Maori methods and experiments, and the contemporary modes of preparation of Phormium, to the structure of the fibres and the potentialities of Phormium tenax.(28)

Most of the discussion and the experimentation had centred around the production of strong pliable fibre of good colour for whatsoever forms of manufacture it seemed to the British experts to be suited. Such controversy as had been raised in New Zealand over its uses had been of minor importance and concerned in the main with the idea of using Phormium for paper as opposed to its suitability for rope. In the south, in Otago, where supplies were abundant and the scene uninterrupted by the war-cries of the Maori insurrection, there was quiet but steady progress with the development of the art of weaving the fibre into matting and wool packs. In October 1868 it was reported that Forsyth's factory at Tokomairiro was "producing matting of excellent quality", and that such was the success of the venture that the

(28) Transactions and Proceedings of the New Zealand Institute,
Vol. 1, (1868) Dr. Purchas on Preparation and Manufacture. (Auckland)
Mr. Travers on Utilisation. (Canterbury)
Vol. 2, (1869) Mr. Nottidge on Structure and Colour. (Canterbury)
Captain Hutton on Structure. (Auckland)
Colonel Heaphy on Maori methods. (Auckland)
Vol. 3, (1870) Wellington meeting for discussion led by Dr. Hector.
Mr. Kirk on Potentialities. (Auckland)
Vol. 5, (1872) Colonel Haultain on Commissioners' Report. (Auckland)

orders received were sufficient to occupy the factory for many months.[29] Two months later the Dunedin firm of Brown Ewing and Company were displaying matting manufactured from Phormium fibre at Taieri Beach by Stewart and Congrave who had received an extensive order from the Otago Provincial Council for the covering of the Council Chamber.[30] Also in the Dunedin papers appeared the first references to making wool packs from Phormium, also produced at Tokomairiro.

At the same time the Wellington Independent once more took up the "editorial pen" to remind the country of the need for a more serious interest in Phormium, and a more whole-hearted attempt to solve all the problems connected with it. The economic advantages of success were again emphasised:[31]

> "Our chief staple exports are wool and gold. Of these, the former has fallen so much in value as to affect most seriously the prospects of the colony, and there are symptoms apparent showing the possibility of a rapid depreciation in the comparative value of the latter.
> "It is evident that New Zealand is very much in want of a third staple export, one that will support a considerable population ... There is reason to hope that our old friend, Phormium tenax, may prove our stand-by on this occasion." (32)

The encouraging reports of good prices from Melbourne, and regular shipments of considerable quantities of fibre from the main ports of New Zealand were cited as auspicious signs in support of the paper's plea.

How was this most worthy object to be gained? Perhaps it was

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(29) Otago Witness, 31 October, 1868, p. 14.
(30) Ibid., 19 December 1868, p. 14.
(31) There was constant mention of both wool and gold in all papers.
(32) Wellington Independent, 5 December 1868, p. 5.

(unconsciously) the idea that "the simplest processes have as yet always yielded the best results",(33) that led Mr. J. McKay, Snr., to suggest again the idea that a form of domestic industry ought to be carried on in the back country, where, otherwise spending leisure hours in "enforced idleness", families with natural supplies close by them could "produce from a half to one hundredweight of fibre per week". This suggestion, made during a lecture in Nelson in 1869, included a system for training rural teachers through the Central Normal School of Industrial Education, in order that the children in country areas might thus be kept from idleness and evil temptation.(34) It will be remembered that this idea had been formulated on a former occasion, in the early days of colonisation.(35)

Concern was being felt, however, that a large number of machines, all producing a fairly mediocre quality of fibre which was finding a somewhat erratic market (probably no more so than the quality of fibre produced!), was being used throughout New Zealand without the slightest attempt to combine the best characteristics of the main types in some united effort to obtain the best possible mode of dressing the fibre. The notices in the main provincial newspapers relating to new machines and processes were prodigious. One could detail at length the different machines invented and altered, the number of mills set up to use these machines, and the many different processes discovered - all recorded in

(33) Otago Witness, 26 December 1868, p. 1.
(34) Appendices to Journals of the House of Representatives, 1870, D.14, Appendix, 14, p. 45-46.
(35) Chapter V, footnote (43); Nelson Examiner, Vol. 2, p. 397.

the columns of the newspapers - and still it would be possible to have missed out just about as many as one mentioned. In the later years of the eighteen-sixties there was an enormous amount of experimenting and improving of machines. It was early in 1869 in Auckland that a machine invented by one, McDougall, was put into production by the implement manufacturer, Price, under the latter's name. The description of the process closely resembled that of the modern stripping machine -

> "a single leaf only - (more than one now, of course) - passes through it at a time, but it (drum) revolves from 800 to 1,000 times per minute... The leaf passes between a crimped and a plain roller, and is crushed by the ribs or beaters (on the revolving drum), which are fixed diagonally upon the drum."(36)

This machine was seen throughout the country with occasional variations, and was improved most by a Wellington man, E. W. Mills.(37) Other machines, however, had their good features, absent from the Price machine, and some of these variations were closed to mechanics other than the inventors by patents. For this reason, therefore, hoping that everyone might gain from their relaxation, "Pro Bono Publico" requested that, for the ultimate benefit of the whole country, no more patents should be granted by the Government, and those already enacted should be withdrawn.(38) It was not until 3 February 1870 that public tests of a number of different machines were made together for open comparison, when those of Price, Gibbons, and Fraser and Tinne, all of Auckland, were tested together to

(36) Otago Witness, 23 October 1869, p. 10.
(37) Wellington Independent, 24 July 1869, p. 4, and 14 August 1869, p. 2.
(38) Wellington Independent, 30 September 1869, p. 3.

compare their efficiency[39] - all these stripping machines worked on the same principle.

A further corporate enterprise for dressing and marketing Phormium fibre received advertisement and encouraging comment from the Wellington paper as well as the Taranaki ones. In October 1869 the Prospectus of the "Patea Flax Dressing Company" was advertised. With a nominal capital of £2,000 and "under judicious direction" it was hoped to cultivate six hundred acres on the banks of the Patea river adjoining the site for the factory to yield an ample supply of green leaf from which it was hoped to produce large quantities of good fibre weekly.[40] Later short notes in the same paper revealed the successful working of the company along with others in the Manawatu and the Wairarapa. Well might the Otago Witness postulate with a feeling of relief, "the flax problem appears to be solved at last"[41] - and it certainly did appear that the problem of producing well-dressed fibre of quality which could command a reasonably high price on the English market had been solved. Added to this success was the moderately good Australian market which had gradually grown up over the years. Had the third staple of New Zealand export been established? The answer to that was still controversial; but it could no longer be doubted that many concerns, which for years had faced bankruptcy, were now obtaining such profits as permitted of improvements to their middle. Indeed it was said that, by

(39) Ibid., 15 February 1870, p. 5.
(40) Ibid., 5 October 1869, pp. 1,2.
(41) Otago Witness, 4 December 1869, p. 1.

the time the Government showed its renewed interest in Phormium tenax, the whole issue was solved and the trade permanently established. New flax mills were appearing all over the country wherever the supply promised to be permanent. In giving his lecture to the Philosophical Institute of Canterbury on 1 September 1869, Mr. T. Nottidge considered that his subject, 'The Structure and Colour of the Fibre of Phormium tenax', was of importance "as the preparation of New Zealand Flax has now become one of the staple industries of this province..." (42)

Though it may be asserted (with considerable evidence to support the claim) that the Phormium fibre trade was now one of the staples of New Zealand commerce with every prospect of advancement, the trade was yet to proceed through many vicissitudes, generally with more severe slumps than prosperous booms. The immediate internal problems facing the industry were the requirements of cultivation and a sufficient supply of green Phormium for all the mills which were being established. Again the press sounded the warning:

> "We notice that already the warning note is sounded in the colony that the natural supply of the raw material is not inexhaustible, and that unless there is some provision made for the future, mills now plentifully supplied, will be stopped..." (43)

In order to try to ascertain what improvement in quality could be gained from selected planting, and also to encourage farmers to cultivate

(42) Transactions and Proceedings of the New Zealand Institute, (1869) Vol. 2, p. 108-111.
(43) Wellington Independent, 20 January 1870, p. 3.

Phormium, the Canterbury Flax Association offered prizes to those who would grow Phormium tenax, and try to improve its quality:

> "For growers of not less than one statute acre:-
> 1st prize, £10; 2nd prize, £4.
> "For growers of not less than half a statute acre:-
> 1st prize, £4; 2nd prize, £2." (44)

The greatest external problems faced by the trade, and over which they had but very indirect control - if they had any at all, - were the stability of the prices realised on the overseas market, and the permanence of the demand for Phormium fibre. All that could be done in the colony to try to ensure the stability of the market was the assurance to the brokers and manufacturers in London, Birmingham, and other great centres in England, America, and on the continent, that a steady supply of fibre of constant, good quality would always be available at the fibre sales. Certainly the view of the newspaper that "English manufacturers, as soon as they see that a large continuous supply is coming in, will adapt their machinery to the peculiarities of the fibre" (45) - an exceedingly optimistic thought - seemed to be to some extent supported by the London firm of Devitt and Hett to whom much fibre had been sent from New Zealand. They wrote in March 1868,

> "... we feel confident that a larger supply would attract the attention of several spinners both in this country and on the continent, who do not find it worth their while to commence using an article the import of which is so small and uncertain." (46)

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(44) Canterbury Flax Association: Information on the Utilisation of Phormium tenax.
(45) Wellington Independent, 20 January 1870, p. 3; also Otago Witness, 8 August 1868, p. 14.
(46) Private letter inserted in Otago Witness, 8 August 1868, p. 14.

In 1870, after the rather encouraging reports and reasonable prices of the previous two or three years, and while the whole country was steeped in the bitterness of depression, the fibre market in England failed. It had been hoped by many people that this new, and apparently flourishing, industry would provide employment for many.(47) Now it was suffering from a price which was reduced by £8 to £10 per ton - a reduced price which left the colonial producers with a deficit they could ill afford to meet.(48) This position persisted for about the first half of 1870 and many mills were closed down, adding to the total unemployment and to the list of those faced with insolvency. About the middle of the year, however, a more hopeful prospect was depicted by the papers, stimulated by another rise in prices.(49)

Yet another problem faced the Phormium fibre industry. Not only were the producers confronted with the urgent need for cultivation if the industry was to be permanent, with the necessity of supplying sufficient quantities of good fibre to obtain a decent market, and with the periods of boom and slump common to the economic development of every aspect of the young colony of which they were a part, but also they were confronted with the prejudice that baled Phormium fibre was peculiarly dangerous to handle because of its susceptibility to spontaneous combustion. Insurance companies increased the premium on all ships

(47) Ibid., 27 November 1869, p. 12-13; also Wellington Independent, 5 December 1868, p. 5.
(48) Wellington Independent, 29 January 1870, p. 6, and 29 March 1870, p. 5; also Otago Witness, 21 May 1870, p. 14.
(49) Wellington Independent, 2 June 1870 "Supplement".

carrying Phormium fibre, and on all other types of cargo which were carried in the same ship as the fibre. Many were the arguments which followed from this action. In 1853, Mr. M. J. J. Donlan had warned the 'uninitiated' of the dangers of 'meddling with' Phormium fibre because of its combustibility;(50) in 1870 the controversy was revived. Some of the exporters in Wellington carried out experiments with baled fibre in the presence of insurance agents to disprove their contention; and in March of that year C. J. Pownall, manager for Johnston and Company, of the Manawatu Flax Mills, forwarded to the Wellington Independent a report of a fire in some warehouses at London Bridge, where bales of fibre had been "stood away, a considerable quantity of which, damaged by water, was sold by auction..." It was claimed by the millers that the fibre deteriorated into dust when subjected to wet conditions for a lengthy period while baled; but they denied that it was more dangerous than wool, or other baled material.(51)

It may be said by some that a young industry must expect such prejudice while seeking to establish itself - if one by 1870 could call the Phormium fibre industry 'young'. Whether or not such is the case, certainly the problems facing the colonial millers, after they had managed to produce reasonably good fibre, were many.

Of the official 'strand' of interest in and activity with

(50) M. J. J. Donlan: Phormium tenax, or Neptune New Rigged, p. 18 ff.
(51) Wellington Independent, 10 March 1870, p. 3, and 15 March 1870, p. 2.

Phormium tenax but little has been said so far, but the sudden spate of Governmental activity (after an apparent lack of interest when no one successfully claimed the governmental rewards) came at the end of the 'sixties, and must occupy the closing pages of this chapter. Although nothing official was done to show the interest of Parliament in Phormium, there were a number of members of the House who had been prominent in a private capacity for their interest in New Zealand flax for a number of years. It is perhaps not so surprising, then, that once formal motions were laid before the House the interest taken was keen.

On 5 August 1869, in the House of Representatives, J. Hall (Heathcote) brought forward a resolution for the formation of a Commission to investigate the potentialities of Phormium tenax, and the best modes of cultivation and manufacture. He drew attention to the too-great discrepancy between the standards of fibre production in the various provinces. He appealed to the Government to investigate the possible standardising of the means both of cultivation and selection of plants, and of processing the fibre. He pointed out the importance and urgency of this matter. A. Ludlam (Hutt) seconded the resolution, adding that the Government ought to "put a small sum on the estimates, so as to enable the Commission to carry out such experiments" as would be necessary for a thorough investigation of Phormium. Julius Vogel (Minister of Finance), amending the resolution slightly, agreed to the

suggestions raised. There was some opposition to the idea of setting up a Commission, but it was rather weak, W. Fitzherbert (Hutt) expressing certain reserved apprehensions for the effect of the Commission's functions on the large issue of protection for colonial industries, but otherwise supporting the proposals. D. McLean of Napier (Native and Defence Minister) "believed that anything which tended to develope a Native industry ought to receive the most careful consideration and cordial encouragement from the Government. The cultivation and preparation of New Zealand flax constituted such an industry ..." After an adjournment and further debate the resolution, as amended by Vogel and rather tacitly agreed to by the Prime Minister, Fox, was passed.(52) It read:

> "That a respectful address be presented to the Governor, praying that His Excellency will be pleased to appoint a Commission to enquire into and report upon the Machinery employed in various portions of the Colony for the preparation of New Zealand Flax, as well as on the varieties of such Flax which it may be desirable to cultivate, upon the best method of cultivation, and the probable result of the same; and also to make enquiries as to any steps that may with advantage be taken to promote and encourage the cultivation and preparation of Flax within the Colony, and its use for manufacturing purposes within and without the Colony." (53)

The New Zealand Government Gazette on 20 September 1869 named the Commission whose names also appeared in the newspapers of the main centres. Four members of Parliament were appointed.

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(52) He was rather in favour of close co-operation and liaison between the central and provincial governments, and with the natives and private manufacturers; nevertheless for want of a better scheme, Mr. Fox supported the idea of appointing a Flax Commission.

(53) New Zealand Parliamentary Debates, 1869, Vol. 6, p. 282 ff; p. 415 ff.

Before the report of the Commissioners was presented to Parliament in the following year, Mr. Hall enquired of the Prime Minister whether anything practical had been done by the Commission: he was informed that Mr. T. Macffarlane (Northern Districts) was preparing an interim report for the House to consider while the official document of the Commission was being drafted.(54) Shortly after this, the Report was completed and presented to the House.(55)

After a brief introduction in which the withholding of all patents for the benefit of the whole community was recommended, the report was divided into three parts concerned with "(I) Growth and Culture, (II) Manufacture, and (III) Machinery".

The Report of the Flax Commission dealt at some length with the cultivation of Phormium tenax, its culture from seeds and plants, and the laying out of plantations. Well-drained swamp land was held to be the best soil in which to plant Phormium; a stagnant and sour soil was definitely detrimental - despite former beliefs. Even the lay-out of the plantation was described, giving about 1,350 plants to the acre. On harvesting the Commissioners adhered to the contemporary idea of side-leaf cutting:

> "The general understanding is that in cutting the flax only the outer leaves should be cut, and that in doing so great care should be taken not to injure the leaves which enclose the centre shoot." (56)

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(54) Ibid., 1870, Vol. 7, p. 155.
(55) Appendices to Journals of the House of Representatives, 1870, D. 14.
(56) Ibid., p. 7.

The selection of varieties presented a real problem to satisfactory cultivation. Mr. Nairn of Hawke's Bay, the Rev. Mr. Taylor of Wanganui, Mr. Armstrong of Christchurch, and Mr. Kelly of New Plymouth had all submitted to the Commission lists of the leading Maori varieties in their districts, giving both the names and uses. The differences in name were somewhat bewildering; but the functional definition of the varieties was strikingly similar. It was suggested that in collecting seeds or roots the Maoris ought to be employed as they knew best how to obtain the finest varieties. Also, in view of Whytlaw's discovery of the fondness of cattle for the young shoots of Phormium, it was recommended that all plantations be well fenced.

The report dealt very thoroughly with all aspects of the 'manufacturing' or processing of the fibre for the market, giving a description of the most common methods of stripping the leaf, and detailing what appeared to the Commissioners to be the most successful ways of washing, soaking and bleaching the fibre. They recommended that it should be stored for a period after bleaching and before scutching since, "if scutched on being taken off the ground (bleaching paddock) the flax will break off short, and make too much tow".(57) Good packing was stressed as an advantage when the fibre appeared on the market, and all millers were advised to pay careful attention to this aspect of their work, using proper presses and strong bale lashings, whether fibre or wire - Captain

(57) Ibid., p. 11.

Hutton preferred the latter for their resistance to fire.

On the cost of production some most interesting remarks were made in the report. On this matter it began:

> "As a rule for the guidance of those intending to engage in this industry, it may be stated that wherever flax cannot be laid down at the port of embarkation at £20, leaving a profit, the manufacture should be discontinued or not commenced ..." (58)

The reason given to support this statement by the Flax Commission, was that the cost of the shipping and handling of the fibre once it left New Zealand could be said, on average prices, to be equal to the amount over £20 per ton realised on the market. An indication of the overhead costs to be sustained by the intending flax-miller was given in detail from figures supplied to the Commission by Captain F. W. Hutton. For all the equipment, machinery, buildings, and adjoining land necessary for a flax mill, the cost was reckoned to be £1,448. The gross income per week, estimated on five tons of fibre at £20 per ton (at the port of shipment), was £100 of which only £13 could be calculated as profit. Of this £676 per annum, "the interest on the capital must be paid". (59) The profits could not be said to be large, nor the prospects - always with the possibility of sudden drastic fluctuations in prices - lucrative to encourage those seeking a 'get-rich-quick' venture.

The section of the report devoted to a consideration of machinery was but a résumé of the principle involved in the most popular

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(58) Ibid., p. 12.
(59) Ibid., p. 13.

machines in use - the longitudinal stripping of the epidermis from the leaf by passing it between a beater-bar and a rapidly revolving drum on which metal blades or beaters were diagonally placed. Different thicknesses of leaf were catered for in all machines by employing india-rubber cushions or coil springs at the back of the feed-rollers.(60)

The general conclusion of the Commissioners was that everything had to be done to make the New Zealand fibre acceptable to the British market, and not - as was the case in 1869 - to answer the increased overseas demand with inferior products, consequently satiating the British market so that no more was desired, and the prejudice against Phormium fibre was entrenched. There was also the implication in the report that New Zealand should no longer expect to compete with other fibres for the same purposes because of inherent differences between Phormium tenax and the Manilla and European hemps and flax. It was further recommended that the Government should appoint another Flax Commission to continue the investigations which the Commissioners had not completed.

Exactly a year after first moving the resolutions for the appointing of the Flax Commission, Mr. Hall, on 5 August 1870, again requested of the Prime Minister whether any practical experiments were to be implemented for testing the theories of cultivation and the principles

(60) Ibid., p. 13-14. - The same principles, with the addition of a 'tailing' device, still apply to the stripping machines of today. They altered but little for many decades: the 'tailer' is a patent of Mr. E. W. Sutton, now Mill Superintendent for New Zealand Woolpack & Textiles Ltd., Foxton.

or processing which the report had discussed. Mr. Fox, praising the work of the Commission, said he thought that the Government "would be prepared, before the session is over, to take steps either to reinstate the old Commission or appoint a new one."(61) He commended the previous Commission on their restraint; they had spent only £50 of the £400 allocated for their use.

Later in the same month (22nd), Fox brought forward a motion for setting up a British Commission on Phormium tenax, to investigate the best means of preparing Phormium for the market, to ascertain for what purposes of manufacture it was suited, and to recommend any steps it thought advisable on the part of the New Zealand Government within the country, or in Great Britain, for promoting the fibre industry. The motion also provided for two Exhibitions of Phormium tenax in Wellington during the 1871 and the 1872 sessions of Parliament, with prizes for the best samples exhibited. Finally Fox's motion stipulated "that a Select Committee be appointed to draw up rules and conditions for the two exhibitions, or to recommend the principles on which they should be drawn up. The Committee to have power to call persons, records, and papers, and to report in a week." To the motion many members took exception, calling in question the usefulness of such a British Commission which had been suggested first to the Government by the

(61) New Zealand Parliamentary Debates, 1870, Vol. 7, p. 348. - Also a reminder on 11 August to the Government that it had promised to provide on the estimates a sum for flax investigation - ibid., p. 464.

Canterbury Flax Association. Eventually, after an amendment by Mr. Kelly, the motion was passed and the Committee appointed, "to consist of Mr. Macffarlane, Mr. Ludlam, Mr. Hall, Mr. W. H. Harrison, Mr. Peacock, Mr. Edwards, Mr. Kelly, and Tareha" (Maori member).(62)

The Flax Commission Select Committee reported back to the House, and on 10 September the clauses of the report were debated seriatim by the House in Committee.(63) The Committee had dealt not only with the proposed exhibitions, but had considered the whole question of a possible British Commission and its work. It therefore provoked some lengthy comments from the Members of Parliament; and it was important as giving the considered judgment of some of those men in Parliament who were best able to provide strong opinions on the fibre industry through their intimate interest in it. All the ten clauses of the report were agreed to, and the new Flax Commission of three in New Zealand and one or two in England was carried. Dr. James Hector (Chairman), Colonel Haultain, and Mr. Kebbell in New Zealand were appointed: the English members were to be selected by the New Zealand commissioners.

The work of the 1871 Flax Commission, as it is generally known, - distinguished from the 1870 Flax Commission set up in September 1869 - was both interesting and important, because it was largely due to its(64)

(62) Ibid., 1870, Vol. 9, p. 151 ff.
(63) Ibid., p. 664 ff. - A summary of the Select Committee's report of ten clauses is attached below, Appendix C.
(64) The Commissions were named by the year in which the majority of their work was done: thus, though set up in 1869, the first was known as the 1870 Flax Commission, and similarly the second, chosen in 1870, was called the 1871 Flax Commission.

efforts that the exhibition of 1871 revealed so well the extent to which Phormium tenax was being processed throughout the country. In November 1870 a letter was drafted by the Commission to the Colonial Agent, John Morrison, in London, requesting details and samples of all the fibres "that compete in the English market with the New Zealand Phormium tenax. Viz., Russian, Manila, Italian Hemp, Bombay Jute and ... Continental Flax."(65) Average prices and annual quantities of these were requested that the New Zealand fibre producers might have a better knowledge of the competition they had to meet. Eventually, after the exhibition was over, these samples were distributed throughout the country to the provincial Superintendents for further demonstration.(66) From all over the country samples of Phormium fibre were delivered to the Flax Commissioners, Wellington, in answer to an appeal to the provinces and to the Maoris.(67) Funds did not permit the Commission to lavish upon organisations like the Canterbury Flax Association money with which they could assist inventors and promoters of the fibre industry, but the Commission did try to aid individuals wherever possible;(68) and it must be conceded even by those without any interest in Phormium, that Dr.

(65) Letter, November 1870, drafter by Dr. J. Hector, - Letter Book, Flax Commission, 1870, No. 9. - This MS. book is held in the Turnbull Library, Wellington.

(66) Letter, 18 December 1871, Hector to Superintendents, - Letter Book, Flax Commission & Colonial Industries, 1871, No. 191, being correspondence relative to the 1871 Exhibition. - This MS. book is held in the Turnbull Library, Wellington.

(67) Letter, 8 December 1870, Hector to Colonial Secretary, Letter Book, Flax Commission, 1870, No. 21; also 23 December 1870, Hector to Assistant Native Secretary, ibid., No. 30.

(68) 30 November 1870, Hector to Canterbury Flax Association Secretary, ibid., No. 13.

Hector and his small committee achieved much.

The 1871 Flax Commission presented its report to Parliament.(69) Considerable comment followed, with a question by Mr. Kelly, asking whether the Commission had done anything positive and practical to test the great variety of machines engaged in flax-dressing in New Zealand. The Colonial Secretary, W. Gisborne (Egmont), replied that the Commission had been empowered to continue its investigations in accordance with the resolutions of Parliament in the previous year.(70) Thus was the life of the Commission lengthened and its value to the country increased.

The Commissioners reported that for the year 1870, throughout New Zealand there were 161 mills, working 342 machines, employing 1,706 men, and 62 women. The total output was reckoned to be 4,257 tons of fibre. The largest number of mills was found in Auckland where 54 were working, followed by Otago with 40, Canterbury with 24, Southland with 17, Wellington with 14. Nelson, which had taken such a pronounced interest in fostering the fibre industry in the early days of the colony, was operating only 2 mills with 3 machines and a total annual output of 18 tons. The largest quantity came from Canterbury where 24 mills were running 50 machines, producing 1,531 tons of fibre per annum; while Auckland's 94 machines produced 1,138 tons; followed by Otago with 66 machines and 581 tons; then Wellington with 38 machines and 508 tons.(71)

(69) Appendices to Journals of the House of Representatives, 1871, G. 4.
(70) New Zealand Parliamentary Debates, 1871, Vol. 11, p. 668.
(71) From TABLE F. of the "Appendix to the Report of the Flax Commissioners", Appendices to Journals of the House of Representatives, 1871, G. 4, p. 101.

From these statistics it was apparent to the Commission, and to Parliament when the report was received, that the country, in a time of depression, could ill afford to have all this labour thrown out of work. The Commission, however, in their remarks were confident of the firmly established and increasing market which awaited good fibre:

> "... the Commissioners feel confident that it (Phormium) has now secured a permanent hold on the market at a remunerative value, which will probably rise as shipments of the fibre become more uniform, and its qualities are better appreciated...
> "But it must be borne in mind that a good price is only obtained for the produce when every part of the process is carefully conducted, and when there is no false economy of labour, or undue waste in conducting the manufacture."(72)

All through the enquiries, whether official or unofficial, into the various aspects of the Phormium fibre industry and trade, there had been the constant difficulty of getting someone to make personal investigations in England and America, to try to gauge opinion in the marketing areas. In 1871, however, the Hon. Julius Vogel, Minister of Finance, went abroad to England via the United States of America on Parliamentary business. He offered to assist the Flax Commissioners' investigations as much as he could if they would supply him with the necessary information and samples. The Commission drew up a memorandum for him. This was followed by correspondence between Vogel and the Commission on various points of importance or interest.(73) On his

(72) "Flax Commissioners' Report, 1871", ibid., p. xvii.
(73) Hector to Vogel, 2 January 1870 (should be 1871), Letter Book, Flax Commission, 1870, No. 42; also 2 March 1871, Haultain to Vogel, ibid., No. 45.

return to New Zealand, Vogel furnished a report to the Commissioners and to the House on his enquiries, carried on for him by his secretary, Mr. E. Fox. In a report, while going through America, Vogel had stated that the clime of opinion there varied according to the acquaintance the manufacturers of the area had with Phormium, but he recorded that the samples were always praised.(74) In "Papers Relating to Mr. Vogel's Mission to England", (75) comprising reports on all matters which he investigated while overseas, comprising reports on all matters which he investigated while overseas, the section on Phormium tenax contained some suggestions which had been noted before, and some which were to be taken up and implemented in the near future.

Vogel urged renewed investigations into the possible uses of Phormium, for purposes other than rope-making, although "care should be taken that such investigations are not allowed ... to prejudice the constantly-growing conviction that the New Zealand fibre is excellently suited for rope-making". Further efforts should be made, he suggested, to produce a more uniformly good quality of fibre, and export inspectors should be employed at the ports to indicate the quality of each bale before it leaves New Zealand.

Already it has been noted that many and various had been the suggestions for possible uses for Phormium, and again, the Canterbury

(74) Appendices to Journals of House of Representatives, 1871, G. 4, p. 14 ff.
(75) Ibid., A. 6 - presented to the House, 26 August 1871.

Flax Association and individuals like Captain Hutton were to be found expostulating on these possibilities.(76) To these suggestions a letter from Dr. I. E. Featherston, Agent-General for New Zealand in London, was added, saying that he was forwarding samples of bleached and unbleached towelling made from Phormium tenax fibre, and promising to send a table-cloth which would be made in the Irish mills as soon as the strikes there were over;(77) but there was no subsequent public comment upon these samples.

The other main idea and suggestion expressed in Vogel's Parliamentary report, however - that of export inspectors who would grade the fibre - was important and influential for the future of the fibre trade. The following letter was addressed by the Commission to the Collectors of Customs at Auckland, Wellington, Nelson, Christchurch, Dunedin, and Invercargill:

> "Sir,
>
> I have the honour by direction of the Colonial Secretary to forward you ... a box containing standard samples of the classes of Phormium fibre, together with samples of Manilla and Sisal Hemp, which are the fibres which compete most with Phormium on the English market.
>
> " You will no doubt receive further instructions from the Colonial Secretary with regard to them. ..."(78)

Here was the beginning of the governmental measures which were to try

(76) Canterbury Flax Association: Utilisation of Phormium tenax, p. 12-20. F. W. Hutton: New Zealand Flax: Its Manufacture.
(77) Appendices to Journals of House of Representatives, 1872, G. 44.
(78) 20 December 1871, Hector to Collectors of Customs, Letter Book, Flax Commission & Colonial Industries, 1871, No. 194.

to regulate the type of fibre which was being exported: this letter contained the germ of the system of grading which became an integral part of the trade after 1872. One might perhaps have seen in this new development the similarity of approach to wool classing; here, for many no doubt, was an indication of the position of importance which New Zealand's fibre had gained in the commerce of the country.

It therefore behoved men to look to the trade from a new aspect, an aspect which showed the steady increase in trade during the previous half-decade. The following table revealed the state of the Phormium trade from New Zealand in the later 'sixties:

" YEAR

	QUANTITY			ESTIMATED VALUE	
	Tons	Cwt.	Bales	Per Ton	Total
					£
1865 -	2	14	15	£27.10.0	75
1866 -	11	3	67	89. 0.0	996
1867 -	126	15	760	33. 5.0	4,256
1868 -	554	0	3,204	15. 5.0	8,137
1869 -	2,027	0	12,162	22. 6.0	45,245
1870 -	5,470	0	32,820	24. 2.0	132,578
1871 -	4,248	10	25,491	21. 6.6	90,611
	12,420	2	74,521	....	281,898
Before 1865	....	..	....	....	17,909
Total value	....	..	....	....	299,807" (79)

In these twelve years of busy colonial life under the Provincial System of government, 1861-1872, New Zealand had witnessed many

(79) J. Hector: Phormium tenax as a Fibrous Plant. Table F., p. 125; also, these figures up to 1870 only, Appendixes to Journals of House of Representatives, 1871, G. 4, p. 101 (Table E.)

changes, and, along with the rest of the country, so had the fortunes of those engaged in extracting from Phormium tenax its white fibre, described at different times and with changing moods, as fine or coarse, strong or poor, brittle or pliable. During these twelve years, however, the opinions of men became less random and general, rather turning towards precise and particular definitions. Also through this period there was a wide expansion of interest in Phormium, financial and permanent where before it had been but experimental and transitory. From the reports of those who were most intimately concerned with the Phormium fibre industry, one could say that it was in the years 1861-1872 that Phormium tenax gained for itself the status of a permanent industry, handled on a nation-wide commercial scale - even if, in years to come, its existence was threatened by all manner of extraneous circumstances.

C H A P T E R VII.

C O N C L U S I O N.

Why, it might be asked, should this study have drawn to a close at 1872? Was that year the natural point at which to half in the story of Phormium tenax in New Zealand History? In so far as it may ever be said of any historical study that a certain date completes a thread of history, just so far it may be said that at 1872 a period in this story ended. Repeatedly up to 1872, what men said about the possibilities of putting Phormium to some profitable commercial use had to be noted; after that date references were constantly being made to the vicissitudes of the fibre trade which was established in the later eighteen-sixties. In fact 1872 marked both an 'end' and a 'beginning'; this date brought to a close the long period of continual experimentation when this native fibre-bearing plant, Phormium tenax, was hopefully regarded as a possible staple export of the young colony. After 1872, both the colony and the trade were well established and organised. Yet another distinction must be drawn between the period of time considered in this study, and that which followed. Before 1872 those engaged in the Phormium fibre trade, whether individuals or companies or associations, carried on their enterprise as single and unrelated units; but with the commissioning of the Collectors of Customs with the task of checking all exported fibre by standard grading specimens, this trade

was organised not on just a provincial, but on a national, scale. Thus while the interest taken by the Government up to 1872 (in keeping with the spirit of the time in regard to Phormium) was investigatory, after that date it became organisational. For these reasons it may truly be said that the year 1872, and the publication of Dr. James Hector's work, Phormium tenax as a Fibrous Plant, marked the end of the experimental period with Phormium before it became a recognised article of commerce in New Zealand's trade.

What had been achieved in the century that had passed, during which Europeans came into constant contact with Phormium? From a casual observation of that plant and its products the Pakeha had proceeded by degrees to a detailed scientific investigation of Phormium tenax. Based upon this investigation, he had slowly but surely progressed in his knowledge of the plant, its fibre, and the fibre's structure, qualities, and usefulness. Despite the many failures which hindered this progress, men had proceeded from fond (and often frustrated) hopes of utilising Phormium for their personal and national benefit to a firm realisation of at least some of the purposes to which the fibre could be applied. Furthermore, a substantial foundation had been laid - both theoretical and practical - upon which future developments could be based and built.

Finally, what importance did Phormium tenax have in the formati

years of New Zealand's history - what influence did this "indigenous production" (as it was so often called) exert upon the thoughts, the activities, and the lives of the pioneers of this country? As this study has developed, one significant point in this connexion has become apparent: scarcely a year passed without some important article of theory or some important discovery in practice being added to the knowledge men in both New Zealand and Great Britain were gaining of Phormium tenax. Each day, each month, each year seemed to hasten the time when this plant and its fibre would play an unrivalled part in New Zealand's economy. This was the predominant thought of the pioneers about Phormium - a thought which became an entrenched attitude reiterated times beyond number by the colonial press, and by hopeful spirits in England. It has been noted that settlers came to New Zealand in the early 'forties for the express purpose of turning to account this oft-mentioned fibre; it has also been seen that the New Zealand Company, the greatest single combination bent on colonising New Zealand, used the potentialities of the Phormium fibre - then but little known - as an inducement for men and women to leave England and journey half way round the world to found for themselves a new home and a prosperous new industry. How many came in actual fact for the purposes mentioned in the Company's prospectus it would be difficult to judge, but when the early meetings held in Wellington

and Nelson to consider setting up flax-dressing mills as the first secondary industry of the colony are remembered, it must be inferred that the interest in flax was not insignificant. Nor could the remarks of men like James Busby relative to Phormium tenax be ignored when its importance was being discussed. All these and similar points of contact between the main personages and trends of New Zealand history and the humble native flax plant would suggest an influence upon that history by Phormium, an influence which, while often subtle and disguised behind personal ambition or commercial prejudice, was important to the formation of the colony. One may say that if Phormium had been regarded as the specific and specialised interest of a few men, not affecting the country as a whole, then Sir Julius Vogel would not have been so willing to assist the investigations of the Flax Commission nor would a government facing the financial straits of a depression have voted money for the thorough enquiry into Phormium with which Dr. Hector and his colleagues were commissioned. Rewards, prizes, and exhibitions, and the concern of both newspaper and Government over the closing of mills throughout the country in 1870, at least showed that the Phormium trade was considered then to be important in the life of New Zealand.

All controversial questions relating to Phormium tenax had not been reconciled or solved by 1872. Many troublous times were ahead

of those engaged in the fibre industry and trade; but it must be acknowledged that from the first descriptions by James Cook and Joseph Banks in 1770 to the last words of James Hector in 1872, from being a curiosity to western eyes Phormium tenax had become an established article of New Zealand trade, and in doing so had assisted in the recognition, colonisation, and development of New Zealand as a British Colony.

APPENDIX A.

"Report on the Microscopic Structure of Phormium Tenax."

(Written by W. R. McNab, M. D., Professor of Botany, Royal Agricultural College, Cirencester, this report was made at the request of the 1871 Flax Commissioners, by order of Parliament, and was included under "Special Reports" in J. Hector: Phormium tenax as a Fibrous Plant, p. 91-92.)

"'General Conclusions: ...

'1. The best fibres are those which have the smallest cavity, and the greatest thickness of wall.

'2. The fibres of different parts of the leaf are of very different values. As the leaf develops from above downwards, the fibres at the apex will be much older than those at the base. Microscopical examination also shows that the fibres at the base (lower part of the butt) and apex (last inch or two of the leaf) ought to be rejected. The leaves themselves ought also to be very carefully selected.

'3. The fibres situated near the under surface of the leaf are often inferior in quality, and that the microscopic structure of the leaf shows that these bundles can only be separated from the tissues with the greatest difficulty.

'4. That no cement exists binding the cells together; the so-called cement of Captain Hutton being the primary cell wall, consisting of cellulose, and easily soluble in chlorate of potash and nitric acid.

'5. That the gum existing on the epidermis of the upper surface is not likely to damage the fibres in any way, and can be easily got rid of along with the epidermis.

'6. That the differences, chemical and microscopical, between Phormium and Russian hemp, and Irish flax, render it improbable that the Phormium can ever be profitably applied to the same uses.

'7. That the resemblances, chemical and microscopical, between Phormium and Manilla hemp, show that Phormium ought to furnish valuable material for the manufacture of ropes, etc. For this end I would urge that the fibro-vascular bundles be extracted from the leaf as nearly entire as possible, and with care, taking advantage of the cellular sheath surrounding them; this ought to be practicable, but the fibres close to the inferior epidermis ought not to be removed.

'8. That as the Natives have overcome all the difficulties, a process as simple as possible ought to be employed, and while the bundles are not broken up into their ultimate cells every care ought to be taken to preserve the natural oily and fatty matters in the fibre.'"

APPENDIX B.

"Report on the Chemistry of Phormium Tenax."

(Written by A. H. Church, M. A., F. C. S., Professor of Chemistry, Royal Agricultural College, Cirencester, this report was made at the request of the 1871 Flax Commissioners, by order of Parliament, and was included under "Special Reports" in J. Hector: Phormium tenax as a Fibrous Plant, p. 104-105.)

"'General Conclusions: ...

'1. That the best and strongest prepared Phormium fibres are those which, while fulfilling the requisite physical conditions and the microscopic conditions determined by Dr. McNab, contain the smallest quantity of mineral matter and the largest quantity of hygroscopic water.

'2. That the age or stage of development of the fibre has much to do with its chemical deportment, and with its strength; and that a considerable portion of the fibre in the leaf must be condemned, both on microscopical and chemical grounds, as of very small value.

'3. The Phormium fibres are more easily and more considerably affected by chemical reagents and by water at the boiling point, and higher temperatures, than most other fibres used for fabrics, ropes etc.

'4. That Phormium fibres are very readily wetted by water and by sea-water, and that this wetting takes place to a small extent even after the fibres have absorbed a considerable amount of wood tar. The microscopical structure of the fibre serves to explain this observation.

'5. That the fact stated in (4) above, taken in connexion with the observation that Phormium fibres contain much matter soluble in water or liable to change, helps to account for the decay of ropes made with the material.

'6. That the use of a mixture of lubricating or machinery paraffine oil with wood tar seems to prevent the entrance of sea-water and the proneness to change in Phormium fibre. It is suggested that as the change of Phormium fibres into "papyrine", by a brief immersion in sulphuric acid, of the strength used in the manufacture of vegetable parchment seems to toughen, strengthen, and waterproof them, this process might be made use of to improve inferior samples of fibre.

'7. That the ultimate fibres are not held together by any cement, but by their cell-walls. These, however, being easily affected by various agencies, are, together with other changeable constituents of the material, a cause of disintegration and weakness.

'8. That the treatment of the plant of Phormium or of its fibre with alkaline matters, especially at a high temperature, may by removing the oil, tend to cause the harshness shown by some fibres, and otherwise injure them.

'9. That the use of the softest water, of a well regulated temperature, and of effective yet uniformly exerted mechanical power, seems to be of importance in the preparation of Phormium fibre.

The relative value of different processes of treatment and bleaching did not come within the scope of the present preliminary inquiry, but could be ascertained with much greater ease than before, through the data given in the present report.'"

APPENDIX C.

REPORT OF THE FLAX COMMISSION SELECT COMMITTEE - 1870

The report of this committee was considered seriatim by the House of Representatives on 10 September 1870. Its clauses were:-

1. "That a Commission be appointed, consisting of three members resident in New Zealand, such Commissioners to have power to appoint one or two agents in England to be in correspondence with the Commission, and, generally, to carry out their instructions."

2. Duties - undertaken by the Commission -

(a) To visit all districts where fibre is prepared; to institute experiments to lessen the cost; to examine all methods, even those used by the Maoris for dressing the flax.

(b) To forward to the agents in England, samples upon which they might experiment to ascertain more exactly the chemical and microscopic qualities of the fibre, comparing it with Irish and Russian flax.

(c) To ascertain why Manilla hemp is more water resistant than Phormium tenax.

(d) To ascertain and compare the capacities of New Zealand, Irish, and Russian hemps to absorb tar.

3. The agents in England to ascertain not only the above, but also to:

(a) See to the market value of Phormium, and the reasons for the differences in price.

(b) To place in the hands of manufacturers, all types of Phormium fibre for experimentation and report.

(c) To get samples of all the fibres on the British market that New Zealand flax-dressers may see the quality required.

(d) To submit to makers of flax machines in England, samples of Phormium tenax and ask them to suggest improvements for the machines already employed in New Zealand.

(e) "To ascertain what can be done to extend the use and increase the market value of the flax fibre."

4. "That properly qualified officers ... should be appointed at each port, who ... should sample the various bales, and place an official brand thereon, showing its quality as compared with standard samples issued to them by the Commission..."

5. "That until we can fix a standard of what constitutes good New Zealand flax fibre, it would not be advisable to have an exhibition next year, or offer £500 in prizes. If any money be spent, it should be applied for ascertaining the best varieties of flax plant which it is advisable to cultivate, and for encouraging the manufacture of ropes, woolpacks and baggage. With this view rewards are recommended to be given to any person or persons who shall manufacture, within the Colony, 20,000 cornsacks, or 5,000 wool, or 20,000 gunny bags."

6. "That there should be an exhibition in 1872, and prizes given, not only as proposed in the Government resolutions, but also for machinery."

7. That samples of the different varieties of Phormium tenax be collected and planted; that the names of and the uses for these varieties be ascertained from the Maoris; that the quality of fibre being produced by the various provinces be compared with these selected varieties; and that the best time for the age and season for harvesting the leaf be investigated by experiment.

8. "That, for the purposes of conducting the above investigation, a sum of £1,000 should be placed by the Government at the disposal of the Commission."

9. "Though it would not be advisable to have an exhibition for prizes in 1871, it is desirable that samples of all varieties of flax fibre prepared in the Colony, and in England, should be exhibited in Wellington during the next sitting of the Assembly, and information furnished as to the results of all experiments made up to that time."

10. "The Committee would suggest that the Government should request Dr. Hector to co-operate with the Commission in carrying out the above recommendations."

After discussion on each of these resolutions, they were agreed to; "the resolutions were reported to the House - (it had been in Committee) - read a second time, and agreed to."

N. Z. Parliamentary Debates, 1870, Vol. 9, p. 664 ff.

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